THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Increasing difficulties of the fuel situation and additional price adjustments in some forms of finished material are the chief features of the market in the past week. The uncertainties of shipments have made buyers less anxious to contract for the more distant future, and there has also entered into the calculations of some the prospect of increased production in the next eight months, so that there is little disposition to anticipate wants beyond July 1. In the case of the United States Steel Corporation, the fact that merchant Valley furnaces are far behind in their deliveries of iron bought by its constituent companies months ago, has held up for the present the negotiations for a large block of Bessemer for delivery after April 1, 1903. As for the opinion expressed by many buyers that prices of pig iron and semi-finished materials will be lower before they will need to buy next year, the turning point still is coke. That is the pivot not only of pig iron, but of steel supply. The further importation of steel-making iron is seriously considered by Central Western interests whose steel works cannot make their full output because of the troubles of furnaces that have their pig iron orders. Foundry trade in pig iron is light, though here and there contracts are being made for the second half of 1903. Northern furnaces are selling No. 2 at $21 at furnace for this delivery, and Southern sellers quote all the way from $18.50 to $20 at furnace. There are indications, in view of the tonnage known to be booked in some cases, that certain Southern producers will be as little able to take more business for the second half of 1903 as they were last spring to book for the second half of 1902. Foreign iron is being engaged by Eastern consumers for the early part of 1903 and prices are rather easier, Middlesboro No. 3 foundry being sold as low as $18.75 at New York. The failure of coke shipments caused the banking of 20 furnaces in the Mahoning and Shenango Valleys this week, and of four in the Chicago and Milwaukee districts. Coke contracts for next year continue to be made, but so-called independent companies are asking $4 for furnace coke at ovens, while foundries are paying $4.50 to $5 on contracts for the first half of 1903. The very heavy tonnage of rails, plates and shapes booked for next year, and the evidences that the railroads will be as busy in rehabilitation work in 1903 as they have been this year, are still the backbone of the iron and steel situation, and extensions under way and projected by iron and steel manufacturers themselves are to be reckoned a strong factor in the prosperity of the trade next year. Yet the frictions and delays and harassments of months are telling in the putting off of work that might have been undertaken, the high prices in some cases also having their effect. Eventually these will be felt, as the machinery trade in some branches is now feeling the accumulated dislocations of the year. The tin plate reduction has been announced, and is 40 cents a box or to $3.60. The wrought pipe and tube price revision is still pending, but business is being done under the expectation that it will be retroactive.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, NOV. 5.

The scarcity of coke and pig iron continues to be the disturbing factor in the local situation. During the past three days, according to conservative estimates 20 blast furnaces in the Mahoning and Shenango Valleys have been banked on account of their inability to secure coke shipments and little relief is promised before the end of the week. The situation is constantly growing worse, the shortage of cars and motive power being now more acute than at any time during the past six months, owing to the withdrawal of all the rolling stock loaned by Eastern roads during the anthracite coal strike. The winter, with its bad weather is dreaded by the furnace operators, for they believe even less coke will reach them than at present, and instead of banking three days every week they fear they will be compelled to bank for still longer periods, until sufficient coke accumulates to operate their stacks for only a few days.

Pig iron deliveries are growing worse, and some of the furnace operators are just making their last shipments on iron specified for delivery during the second quarter of this year. With the present state of affairs continuing the deliveries of third quarter iron will run well into January while iron contracted for the first quarter of next year cannot possibly be delivered before the end of June.

Steel producers are suffering greatly on account of the scarcity of Bessemer iron, and several of the large independent steel companies are again figuring on further large orders for foreign Bessemer. Negotiations have already been opened with a number of large English producers for the purpose of securing a somewhat better price than they are naming at present, and if this can be secured a number of large orders will be placed. At present Bessmer iron cannot be delivered here under $23.50 to $24, which is an advance of about $2 per ton over the price paid for this iron several months ago when about 100,000 tons were contracted for.

The coke market has been exceedingly active during the week and prices have advanced sharply. While a number of large orders for furnace coke were placed last week at prices ranging from $3 to $3.50 per ton for delivery throughout next year the prevailing price today for this delivery ranges from $3.75 to $4 at the ovens, while foundry coke is held at $4.50 to $4.75 and some coke operators are holding out for $5 on contracts specifying delivery only through the first half of the year. Many large furnace operators have not yet covered for any of their coke for next year's delivery, believing that with the large capacity that will come into the market during the next two months prices will ease off.

As anticipated, the American Tin Plate Co. this week announced a reduction on 100-pound boxes of coke plates from $4 to $3.60 to become effective on Dec. 1. The reduction is greater than was anticipated by the trade generally as $5 per ton was believed to be a very great concession. The reduction of $8 a ton will be followed by the placing of considerable business inasmuch as jobbers generally throughout the country have let their stocks run down in anticipation of these new prices. The lower price on the domestic plate will have no effect whatever in securing the rebate trade, as the price to be quoted on that must be only a trifle lower than that asked for the Welsh plate delivered at the seaboard, although the price asked for the domestic plate minus the 25 percent reduction in the cost of rolling brings the price of this plate without further concessions on the part of the American Tin Plate Co. very close to the present price of the Welsh plate delivered at New York or Baltimore. With the assurance given the large jobbers in merchant pipe that they would be protected on the

new price to be announced by the National Tube Co. shortly, large orders are being placed, the demand being unusually heavy. It is stated that on the new basis of quotations the pipe trade will be in a healthier condition than at any time during the past six months. The demand for wire products and sheets continues very strong, the concessions in prices no doubt having stimulated demand.

PIG IRON.—No transactions have been reported in Bessemer iron during the week, for the reason that furnaces are in no position to make deliveries on new business during the next six months. Their tonnage already under contract is much heavier than they can possibly take care of and every pound of iron made at the merchant furnaces is being delivered on specifications made three and four months ago. Practically no domestic foundry iron is being sold and occasional carload lots of Canadian and English foundry iron are being sold at prices ranging from $23.50 to $24.50 per ton. The pig iron capacity of the Shenango Valley is to be further increased by the erection of two 400-ton stacks at Sharpsville, Pa., by the Shenango Furnace Co., of this city. Plans are now being prepared, but owing to the scarcity of building material and the overcrowded condition of the engine plants of the country it is not probable that the furnaces can be completed in less than a year. The output will be sold to the independent steel producers and will add to the capacity of the merchant furnaces in the Valleys. We revise quotations as follows:

Bessemer, Valley	$21 50 to 23 00
Bessemer, Pittsburg	22 25 to 23 75
No. 1 Foundry	24 00 to 25 00
No. 2 Foundry	23 00 to 23 50
No. 2 Foundry	23 50 to 24 00
Gray Forge, Pittsburg	21 25 to 21 50
Chilled Basic, Valley	21 00 to 21 50
Chilled Basic, Pittsburg	21 75 to 22 25

STEEL.—Sales of open-hearth steel continue to be made in this district at prices ranging from $30.50 to $31 for ordinary specifications while high carbon billets are held as high as $33. Bessemer billets are quoted at $29 to $30 per ton, but few sales are being made. The ruling of Commisioner Jewell at New York does not satisfy prospective consumers of foreign billets and until a final decision is handed down by the general board of appraisers it is not probable that any further contracts for steel will be made. According to the present quotations in Germany, billets from the mills in that country can be laid down in Pittsburg at $29 per ton. The rod market continues firm at $36 to $36.50.

FERRO-MANGANESE.—English manganese continues to be held at $50 per ton for 80 percent delivered in small lots in this district and on a large tonnage as low as $49 could possibly be done. The German makers continue to hold their product at $51, Pittsburg.

SPELTER.—The spelter market has eased off considerably, and prime western grades are now held at 4.25c to 4.27½c, delivered, Pittsburg.

MUCK BAR.—With forge iron continuing scarce and high in price there is no falling off in the price of muck iron. We quote neutral bars at $35.50 to $36, at mill, Pittsburg.

SKELP.—The market continues to rule quiet with iron skelp, grooved and sheared quoted at 1.95c to 2c, and steel at 2.05c to 2.10c.

RAILS AND TRACK MATERIAL.—Further heavy business in rails for delivery next year is pending, and with the orders that will run over into next year, it is estimated that fully 2,000,000 tons are on the books of the rail makers of the country at present. We make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $44; 12 pounds, $43; 16 pounds, $41; 20 pounds, $40; 25 to 40 pounds, $38 to $39. Track materials: Spikes, 2.15c to 2.25c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

BARS.—The demand for steel bars continues to improve, yet the large producers are not securing as much business as formerly owing to the increased outside capacity which has come in during the past three months. The demand for iron bars continues good, with some cutting of the 1.80c basis. We quote as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2.25c and upwards.

PLATES.—Little new business in plates has been placed during the past week. As all of the mills are months behind in their orders, however, this is considered a relief and an opportunity will be given them to catch up on specifications. We make the following quotations: Tank plate for early delivery is held at 2c, while for delivery next year mills are quoting 1.75c to 1.85c. Agreement quotations are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary fire-box, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

STRUCTURAL MATERIAL.—The demand for structural material for delivery next year continues strong and heavy contracts continue to be placed by fabricators. For prompt delivery prices ranging from 2c to 2.50c are asked, while on business for next year's delivery the following agreement quotations are made: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

PIPES AND TUBES.—With the assurance that they will be protected large jobbers in merchant pipe are placing heavy contracts with the National Tube Co. for future deliveries. While new discounts have not yet been named they will probably be given to the trade by the middle of this month. The butt weld department of the McKeesport plant of the National Tube Co. was shut down this week until accumulated stocks can be worked off, but as large orders are now being received for this kind of pipe an early resumption of this department is anticipated.

SHEETS.—The demand for sheets is reported good and heavy orders are now being placed by jobbers, who have held off in anticipation of another reduction, which they have been assured will not be made, as there is a likelihood of present quotations being withdrawn on Dec. 1. Our quotations on sheets in 500-bundle lots and over are as follows: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. The competition on galvanized sheets continues very keen and the new prices of the American Sheet Steel Co. are being met by the independent manufacturers. The prices on galvanized sheets quoted by the American Sheet Steel Co. for 500-bundle lots and over are as follows, with their equivalent discounts: No. 16, 2.60c, or 75 and 10 and 3½ off; No. 18, 2.85c, or 75 and 10 and 1 off; No. 20, 2.85c, or 75 and 10 and 2 off; Nos. 22 to 24, 3.10c, or 75 and 10 and 2 off; No. 26, 3.35c, or 75 and 10 and 1 off; No. 27, 3.60c, or 75 and 10 off; No. 28, 3.85c, or 75 and 10 off; No. 29, 4.35c, or 75 and 7½ and 2 off; No. 30, 4.50c, or 75 and 10 and 5 off.

WIRE AND WIRE NAILS.—Mills report the receipt of heavy orders for wire nails and wire products, although the high price of rods and the small differential between them and the finished products are causing many of the independent manufacturers some worry. We make the following quotations: Wire nails, carload lots, f. o. b. cars, Pittsburg, $1.85 to $1.90; less than carload lots, $1.95 to $2; plain wire, carload lots, $1.75 to $1.80; less than carload lots, $1.85 to $1.90; barb wire, carload lots, $2.15 to $2.20; less than carload lots, $2.25 to $2.30; staples, carload lots, $2.05, and less than carload lots, $2.15. Galvanizing, 30 cents extra. Cut nails are quoted as follows: Carload lots, $2.05, and less than carload lots $2.10, f. o. b. Pittsburg, plus freight to point of destination, terms 60 days, less 2 percent off in 10 days.

MERCHANT STEEL.—The market in all lines continues strong and new business on the finer grades of steel is reported very satisfactory by the large manufacturers. We quote as follows: Turned cold rolled and ground shafting is held at 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c

to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

Old Material.—The market continues very quiet and dealers who have large stocks in their yards believe that somewhat lower quotations must be made before the buying movement will set in again. Our quotations, gross tons are as follows: Heavy melting stock, $21 to $21.25; low phosphorus melting stock, $23.50 to $24; steel rails, $21 to $21.25; re-rolling rails, $22.50 to $23; No. 1 cast scrap, $19 to $19.50; borings and turnings, $11 to $11.50; busheling scrap, $16 to $16.50.

Coke.—Somewhat lower prices for coke for prompt delivery is being named by producers outside of the Connellsville region and carload lots of furnace and foundry coke for early shipment are now being sold at $6 to $7 per ton. Furnace coke for next year's delivery is now being held at prices ranging from $3.75 to $4 at the ovens, while foundry coke for next year's delivery is quoted at $4.50 to $4.75. For the week ending Saturday, Oct. 25, the production of the upper Connellsville region amounted to 251,321 tons, while the production of the lower region reached 50,112 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK Nov. 4.

The coke supply and the car shortage are the dominating features of this merket. Both are as bad as they possibly can be, and there appears to be no hope for any material improvement in the near future. This conditions effects more generally furnaces and mills in the Central West and Western districts. South of the Ohio river little distress is felt. The Southern furnaces are working to their fullest capacity, and regular shipments are being made on their contracts. Railroads are making strenuous efforts to prevent a congestion of traffic in this locality. Large numbers of ore cars have been sent down from the ranges to relieve the situation and all the second-hand cars that can be purchased are being put into service as fast as they can be made ready. Hampered as the railroads are by the lack of motive power, and with hundreds of loaded cars on every track leading into or out of this city, no great relief can be expected for the present. During the past week the Zenith furnace at Duluth, the Calumet furnace at South Chicago, the Thomas furnace at Milwaukee and the Mayville furnace at Mayville, Wis., were banked a few days each for want of coke. The pig iron production of this section was further decreased by the blowing out of one of the Iroquois furnaces, working on malleable pig iron, which requires to be relined before it can be put in blast again. Excepting in the heavier lines of finished iron and steel, buying has not been active. Demand for crude materials has also been quiet, excepting for immediate delivery; here there is a heavy inquiry. The competition of independent producers of sheets, merchant pipe and tubes has resulted in a falling off in demand, consumers preferring to wait for the market to assume a more stable position before placing orders. Some of the local bar mills are suffering for want of specifications and orders, one producer having decided to shut down its plant entirely until higher prices can be obtained. A heavy tonnage has been booked in rails, plates and wire products. Scrap iron has improved in strength, considerable buying having been done in the past week.

Pig Iron.—All the Southern furnaces have opened their books for the second half of next year, offering iron on the basis of $18.50 for No. 2 foundry at the furnace. For delivery in the first six months, $20 for No. 2 foundry is the general quotation, though some scattered furnaces are asking $21. So far, little inquiry for the last half has manifested itself, melters contenting themselves with buying for immediate needs. A sale of 5,000 tons of No. 2 foundry for delivery during the balance of this year, is reported to have been made last week by a Southern furnace at $24.15 for one lot and $24.65 for the balance, Chicago delivery. A number of malleable foundries were in the market during the week for iron for prompt shipment and sales of 5,000 tons of standard Bessemer were made at $25 to $26 Chicago, and of 500 tons of Lake Superior charcoal iron for delivery early next year at $26.25, Chicago. Another consumer placed an order for 1,000 tons for immediate shipment, 750 tons of which was for No. 2 the balance being divided into other grades. Numerous smaller sales have been made, prices varying according to the size of the order and the credit of the consumer. Among the tentative inquiries received by sellers for future delivery, was one from a large pipe manufacturer, which is endeavoring to replace by prompt shipments the shortages it has incurred due to the idleness of the furnaces in the summer. This concern placed contracts abroad for about 20,000 tons of iron, but with these shipments coming in, it is unable to operate all its plants continuously and is seeking relief in the open market. Our quotations for delivery in the first half are as follows:

Lake Superior Charcoal	$26 00 to 27 00
Local Coke Foundry No. 1	23 50 to 24 00
Local Coke Foundry No. 2	23 00 to 23 50
Local Coke Foundry No. 3	22 50 to 23 00
Local Scotch Foundry No. 1	24 00 to 24 50
Local Scotch Foundry No. 2	23 50 to 24 00
Southern Coke No. 1	24 15 to 24 65
Southern Coke No. 2	23 65 to 24 15
Southern Coke No. 3	23 15 to 23 65
Southern Coke No. 4	22 65 to 23 15
Southern No. 1, soft	24 15 to 24 65
Southern No. 2, soft	23 65 to 24 15
Southern Gray Forge	21 65 to 22 15
Southern Silveries	26 65 to 27 15
Jackson Co. Silveries	31 00 to 32 00
Ohio Strong Softeners	26 10 to 27 10
Alabama Car Wheel	27 15 to 27 65
Malleable Bessemer	25 00 to 26 00

Bars.—Some mills report that buying was active during the week and that specifications were about normal; others take quite a contrary view. This condition is better illustrated by the statement of one company that its specifications of last month exceeded by 10,000 tons those of September, while another announces that it has been compelled to close its plant and sell its stock of pig iron because it can not get either specifications or orders. Relatively lower prices for bar iron are prevailing in this market than anywhere else in the country, and those mills that are not in urgent need of orders have withdrawn from the market until better prices can be obtained. There has been a good demand during the week for steel bars and angles. Mills are still running short on specifications for heavy sizes of iron and steel bars, though they are well supplied with smaller business. We quote mill shipments, Chicago delivery, Bessemer steel, 1.75c to 1.85c; angles, less than 3x3, 1.85c to 1.95c base; iron, 1.80c to 1.90c; hoops, 2.15c. Prices for stock from store, steel, 2c to 2.10c; iron, 2.15c to 2.20c; hoops, 2.40c to 2.50c; angles, 2.50c to 2.60c.

Sheets.—There is a good inquiry for light sheets and a fair tonnage has been placed during the week. The market has not yet recovered, however, from the recent reduction in price, buyers seeming inclined to pursue a waiting policy. We quote No. 27 black, mill shipments, Chicago delivery, 2.80c to 2.90c; galvanized, 3.35c to 3.40c; from store, No. 27 black, 3.05c to 3.15c; galvanized 75 and 5 percent.

Structural Steel.—Several contracts for new buildings have been placed in the past ten days with local contractors, but most of the material will come from stock, or will apply on contracts already placed with the mills. Among these is the contract for the Fine Arts Building of the Louisiana Purchase Exposition, 250 tons; an eight-story office building for Armour & Co., 3,000 tons; a cold storage warehouse, 3,000 tons and 2,500 tons of steel castings. We quote mill prices as follows: Beams, 15 inches and under, 1.75c to 1.85c; 18 inches and over, 1.85c to 2.10c; structural angles, 3x3 to 6x6, 1.85c to 2c; universal plates, 1.75c to 2c; angels, channels and tees smaller than 3 inches, 1.85c to 2c base. Prices on lots from store, 2½ cents to 3½ cents per pound.

Billets.—A few small lots of domestic open-hearth and foreign forging billets have been sold, the former on the basis of $38 to $40, and the latter at $37.50.

Rails and Track Supplies.—A large inquiry for heavy rails has come into the market, but owing to the crowded condition of mills and their inability to give early deliveries, the greater portion of this will not be placed. Orders for about 1,000 tons of light rails were placed during the week, and an order for 3,000 tons of heavy sections was placed in Germany, the price being $33 f. o. b. Galveston. There is a good demand for track supplies of all kinds. We quote standard sections, $28; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate

sizes; light rails out of store, $45 to $50. Track supplies, mill shipments, as follows: Angle bars, 2c to 2.15c; spikes, first quality, 2.25c; second quality, 2.15c track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.20c, with usual differentials for other sizes.

MERCHANT STEEL.—A little new business has been placed during the week, but most of the large buyers are fully covered for their season's requirements. Specifications are full and mills are behind in deliveries. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.25c to 2.35c; out of stock, 3c to 3.10c ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 percent to 10 percent higher; cold rolled shafting, carload lots, 47 percent off, Chicago; less than carload lots, 42 percent off, Chicago.

MERCHANT PIPE.—Buying has been reduced to a minimum as a result of the cutting of outside mills. We quote:

MERCHANT PIPE, RANDOM LENGTHS.
(Jobbers, Chicago Basing Discounts.)

	Black. Percent.	Galv. Percent.
⅛ to ½ in. inclusive	58½	46½
¾ to 12 in. inclusive	65½	53½
(Consumers, Chicago Basing Discounts.)		
⅛ to ¼ in. inclusive	56½	43½
¾ to 12 in. inclusive	63½	50½

BOILER TUBES.

Steel.

	Percent.
1 to 1½ in.	35
1¾ to 2½ in.	45
2¾ to 5 in.	55
6 to 13 in.	47½

Iron.

	Percent.
1 to 1½ in.	35
1¾ to 2½ in.	32½
2¾ to 5 in.	42½

CAST IRON PIPE.—The local producer reports that it is not making deliveries promptly, owing to the curtailment of its supply of raw material. No large orders have been placed, new business being limited to small lots. We quote f. o. b. Chicago, 4-inch water pipe, $37; 6-inch, $36; 8-inch and upward, $35; gas pipe $1 a ton higher.

PLATES.—There is a heavy demand both from mills and store, the local interest reporting orders aggregating 15,000 tons for delivery next year. The activity in the building line is creating a brisk demand for universal plates, some mills being sold up on these for the year. We quote mill prices, Chicago delivery, future shipments: Tank steel, ¼-inch and heavier, 1.75c to 2c; flange steel, 1.85c to 2.10c; from stock, tank steel, ¼-inch and heavier, 2.25c to 2.40c; 3-16, 2.35c to 2.50c; No. 8, 2.40c to 2.60c; flange steel, 2.50c to 2.65c. We would note that though there has been no change from the mill price of 1.75c, independent mills able to give prompt delivery are asking not less than 2c to 2.10c for delivery within the next three to six months.

WIRE AND WIRE NAILS.—Large orders have been placed during the week for all kinds of farming material. Wire nails have also been moving briskly. We quote prices to jobbers, carload lots, Chicago delivery, as follows: Smooth wire annealed, 1.90c; galvanized, 2.20c; painted barb wire, 2.30c; galvanized barb wire, 2.60c; wire nails, $2; cut nails, 2.20c; polished staples, 2.15c; galvanized staples, 2.45c. Prices to retailers are 5 cents higher than above quotations on carload orders, and 15 cents higher on less than carload lots.

COKE.—No improvement is to be noted in the receipts of coke in this district. Four furnaces banked during the past week for want of fuel. Colorado coke is still being offered in this market at $10 to $11, but its unfitness for foundry use prevents many foundrymen from buying it. Connellsville and West Virginia coke is being offered for delivery next year at $7 to $7.50, Chicago, though little is being bought because no assurances can be given as to its delivery.

OLD MATERIAL.—The scrap market took a rise in the past week due to the buying of some large lots by mills. Railroads and country dealers are offering material freely. Relaying rails are strong, one sale of several thousand tons being made at $31.25. Cast iron scrap of all kinds maintains its past firmness, car wheels especially being in active demand. We quote gross tons, as follows:

Old Iron Rails	$24 50 to 25 00
Old Steel Rails (mixed lengths)	18 00 to 18 50
Old Steel Rails (long lengths)	23 00 to 23 50
Relaying rails	31 50 to 32 00
Old wheels	22 50 to 23 00
Heavy melting steel	17 00 to 17 50
Mixed country steel	15 50 to 16 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$20 00 to 20 50
No. 2 R. R. wrought	18 50 to 19 00
Shafting	19 50 to 20 00
Dealers' forge	16 50 to 17 00
No. 1 busheling	14 50 to 15 00
No. 1 Cast	16 50 to 17 00
Railway malleable	16 00 to 16 50
Country malleable	14 50 to 15 00
Iron axles	24 00 to 24 50
Steel axles	21 00 to 22 00
Cast borings	10 50 to 11 00
Wrought turnings	14 00 to 14 50
Iron axle turnings	15 00 to 15 50
Steel axle turnings	13 50 to 14 00
Stove plates	12 50 to 13 00
Old iron splice bars	21 50 to 22 00

The C. A. Stevenson Pig Iron & Coke Co., St. Louis and Chicago, has secured the sales agency in Chicago territory for the product of the LaFollette furnace at LaFollette, Tenn.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Nov. 5.

IRON ORE.—There has been marked scarcity of tonnage at Escanaba during the week, as vessels were unable to get cargoes of coal to take to that port. Several charters were made for Buffalo at 75 cents, some business was done for Ohio ports at 70 cents and other shippers succeeded in getting tonnage at 65 cents. The prevailing rate at Duluth is still 80 cents and at Marquette 70 cents. Very little ore is being shipped from Marquette. Dispatch from Cleveland and other Lake Erie ports shows little improvement.

The total shipments of ore from northern ports for October are surprisingly large, being 3,311,426 tons, as compared with 2,986,468 tons for October, 1901, and nearly as large as for September, 1902, when 3,657,080 tons were shipped. The shipments to Nov. 1 are 24,019,770 tons, or 5,874,936 tons more than for the same period last year. The shipments last year after Nov. 1 were 2,006,096. So, even if there is no gain over 1901 for the remainder of the season, the water shipments for 1902 will foot up more than 26,000,000 tons. This would be 3,000,000 tons more than was estimated early in the season.

COKE.—So intense has been the strain upon the foundrymen on account of coke shortage that such a strike as that of the molders in light gray iron shops, which now prevails in Cleveland, causing a number of foundries to suspend, is almost regarded as a relief. Receipts of coke in this city this week have been just as slow as they were last week. The announcement that the Frick Co. would not sell to foundries had a stiffening effect on the market and $4.75 at the ovens is now the best that can be done for next year for foundry coke, except possibly on a very desirable contract. Some large furnace interests are making inquiry as to coke and have not yet determined where their supply will come from, nor do they know what price they will be compelled to pay.

PIG IRON.—Some sales of domestic are being made for the second half on a basis of $21.75, Cleveland, for No. 2 foundry and $22.75 for No. 1 foundry. A limited amount of Alabama iron for this year's delivery from a furnace recently sold has been doled out in small quantities at fancy prices. Foreign iron is selling at the following prices. German (2⅓ to 3 percent silicon), $25.50; Scotch, $24.50 to $25.50; English, No. 2 Middlesboro, $23.50 to $24. The long promised Nova Scotian iron has not yet arrived and if we may judge from the difficulties experienced in getting this iron to Cleveland up to the present time, the Nova Scotian product will not be an important factor in this market. We quote as follows for shipment in the first half of 1903:

Bessemer	$21 75 to 22 25
No. 1 Strong Foundry	23 00 to 23 50
No. 2 Strong Foundry	22 50 to 23 00
No. 3 Foundry	21 75 to 22 25
Scotch No. 1	23 00 to 23 50
Scotch No. 2	22 50 to 23 00
Gray forge, Valley	20 75 to 21 00
Lake Superior Charcoal	25 00 to 26 00

FINISHED MATERIAL.—Competition in sheets has not been so fierce this week and some jobbers express the opinion that there will be no further reduction in prices. The fact remains, however, that the smaller companies are still cutting about $2 per

ton below the prices of the principal producers and are getting considerable business. The prices of distributors of the product of the leading seller are as follows: For 3-16-inch sheets and heavier, 2.10c to 2.15c, Cleveland. Mill sales of black sheets, Cleveland, to consumers: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c; and the following prices out of stock No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60; No. 14, 2.50c to 2.60c; No. 16, 2.55c to 2.70c; Nos. 18-20, 2.75c to 2.90c; Nos. 22-24, 2.85c to 3c; Nos. 25-26, 2.95c to 3.10c; No. 27, 3.05c to 3.20c; No. 28, 3.15c to 3.30c. On galvanized sheets we quote mill sales in carload lots, Cleveland, as follows Nos. 10 and 11, 2.60c to 2.75c; Nos. 12-14, 2.70c to 2.85c; Nos. 15-17, 2.80c to 2.95c; Nos. 18-21, 3c to 3.15c; Nos. 22-24, 3.30c to 3.45c; Nos. 25-26, 3.55c to 3.70c; No. 27, 3.80c to 3.95c; No. 28, 4.05c to 4.20c; No. 29, 4.45c to 4.60c; No. 30, 4.95c to 5.10c. Galvanized sheets out of stock are quoted 75 and 2½ off. Bar iron is not so strong. Small lots are sold at 1.80c, Pittsburg, but 1.75c, Pittsburg, is the ruling price for fair sized orders and it is reported that sales have been made as low as 1.70c, Pittsburg. We quote steel bars at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg. These prices are firmly maintained. Sales out of store, Cleveland, are at the rate of 2c for iron and 1.90c to 2c for steel, while from 2.10c to 2.25c is paid for large rounds. Plates and structural material are strong and deliveries can not be guaranteed short of six months, as a rule. The scarcity and high prices of structural material are delaying the erection of buildings and in some cases, of which the Union Club's new house in Cleveland is an example, construction has been indefinitely postponed. The Union Club found that the new house would cost 30 percent more than had been estimated.

OLD MATERIAL.—There has been marked dullness except in machine scrap, but prices have not changed. We quote Cleveland prices, all gross tons, as follows:

Old iron rails	$25 50 to 26 50
Old steel rails (over 6 feet)	22 00 to 23 00
Old steel rails (6 feet and under)	21 00 to 22 00
Old car wheels	20 00 to 21 00
No. 1 R. R. wrought scrap	23 50 to 24 00
Mill scrap	19 50 to 20 00
No. 1 machine cast scrap	20 00 to 21 00
Iron axles	29 00 to 30 00
Steel axles	28 00 to 29 00
Axle turnings	18 50 to 19 50
Wrought turnings (free from cast)	16 00 to 17 00
Cast borings	12 00 to 13 00
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	17 00 to 18 00
Grate bars	12 00 to 13 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	12 00 to 13 00
Wrought drillings	15 00 to 16 00
Malleable iron (railroad)	20 50 to 21 50
Malleable iron (agricultural)	17 50 to 18 00
Stove plate	15 00 to 16 00
Heavy steel	19 00 to 20 00

CINCINNATI.

Nov. 4.

There is apparently no relief from the scarcity of coke which has been complained of so seriously in the recent past. Transportation and motive power show no signs of improvement. Coke ovens still have large quantities of coke ready for transportation, but are unable to obtain facilities for moving it. Furnaces continue to run irregularly owing to short fuel supply. Spot coke is selling from $9 to $11 per ton at ovens. The retirement of the Frick Coke Co. from the general foundry coke business next year has created some disturbance, as its customers must now find other scurces of supply. When the Frick customers appeal to other operators and sales agents they find that for a time they will have to come in after regular customers have been supplied. In finished material the market shows weakness on most light lines, while the heavy lines continue firm.

PIG IRON.—Business in pig iron during the week has been fairly active. Sales have been more in number and the aggregate tonnage somewhat larger than the preceeding week. Much of the business has been for deliveries during the first half of 1903. There is also more spot iron offering. Inquiries for the last half of next year are more numerous. In this connection there seems to be considerable uncertainty in regard to the price fixed by the Southern iron producers at their New York meeting on Oct. 24. Figures have been published ranging from $17 to $20 for No. 2 foundry iron as the minimum price f. o. b. furnace for the second half of 1903. Some sales agents, representing furnaces who were present at the meeting, have been asked to obtain $20 Birmingham, but the opinion prevails that very little, if any, business can be obtained on this basis. Virginia furnaces have expressed a willingness to make contracts for the second half of next year at the equivalent of $19 Birmingham. Transactions for delivery in the first half of next year are at previous prices. No. 2 foundry sells mainly on the basis of $20 Birmingham with some of the offerings held at $21 to $22. Virginia irons continue to sell at the equivalent of $19 Birmingham. The spot iron market has been right interesting under increased offerings and an easy tone prevails, although quotations are very irregular. One lot of 200 tons of No. 2 foundry was offered at $24.75 f. o. b. Cincinnati, but the sale was not consumated, $24 being bid and refused. There have been sales above these prices, but this furnishes an instance indicating the easier tendency. No. 3 foundry is offered at $19 spot Birmingham. No. 4 foundry and gray forge are plentifully offered and dull at $16 spot Birmingham. Prices f. o. b. Cincinnati for delivery after Jan. 1, 1903 are as follows:

Southern Foundry No. 1	$23 75 to 24 25
Southern Foundry No. 2	23 25 to 23 25
Southern Foundry No. 3	23 25 to 23 75
Southern Foundry No. 4	20 75 to 21 50
Southern Foundry No. 1, soft	23 75 to 24 25
Southern Foundry No. 2, soft	23 25 to 23 25
Gray Forge	20 00 to 21 00
Northern Foundry No. 1	26 10 to 26 60
Northern Foundry No. 2	25 10 to 26 10
Southern car wheel iron	28 00 to 29 00
Malleable coke iron	25 00 to 25 75

FINISHED MATERIAL.—The easier tendency which has characterized the market for lighter materials is more pronounced and prices are lower on sheets and iron and steel bars. Wrought pipe, while not quotably lower, is selling at figures below quotations. At the reduced prices there is a fair demand. In the heavy lines the market continues firm with deliveries difficult to obtain. The troubles incident to the transportation situation are annoying handlers of finished material, and this to some extent accounts for delay in making deliveries. Sales of black sheets No. 27 are at 2.75c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.20c; No. 27, 3.10c; No. 16, 2.75c; No. 14, 2.65c; No. 12, 2.60c; No. 10, 2.50c. Galvanized sheets car lots sell at 75 and 10 percent off; less than car lots 70 and 10 percent off. Tank plates out of store are quoted at 2.30c for ¼-inch and 2.40c for 3-16-inch. Prices for bar iron in carload lots are: 1.82c base, half extras f. o. b. Cincinnati; steel bars, 1.72c base, half extras f. o. b. Cincinnati. Both are retailed at 2.10c base, half extras, out of store. Beams and channels are selling at 2½c to 3c retail, and angels at 2.40c for base sizes. Wrought pipe and boiler tubes are quoted as follows for carload lots f. o. b. Cincinnati:

WROUGHT PIPE.
(Basing Discounts.)

	Black. Percent.	Galv. Percent.
⅛ to ½ in. inclusive	58.8 & 10	46.8 & 10
¾ to 12 in. inclusive	65.8 & 10	53.8 & 10

BOILER TUBES.

	Steel. Percent.	Iron. Percent.
1 to 1½ in.	43.8 & 2½	41.8 & 2½
1¾ to 2½ in.	56.3 & 2½	53.8 & 2½
2¾ to 5 in.	61.3 & 2½	48.8 & 2½
6 to 13 in.	56.3 & 2½	33.8 & 2½

OLD MATERIAL.—The demand has not been so urgent and the market is slightly easier, although there is no important change in prices. Old No. 1 railroad is quoted a shade lower. Old car wheels are scarce and firm. Higher prices are asked for cast borings. We quote as follows:

Old No. 1 Wrought Railroad, net tons	$20 75 to 21 00
Cast Machine and Foundry, net tons	17 00 to 17 25
Old Iron Rails, gross tons	25 00 to 26 00
Old Steel Rails, gross tons	24 50 to 25 00
Old Short Lengths, gross tons	18 00 to 18 50
Old Iron Axles, net tons	29 00
Old Iron Car Wheels, gross tons	22 00
Stove Plate, net tons	11 75 to 12 00
Wrought Turnings, net tons	16 00
Cast Borings, net tons	11 50 to 12 00

PHILADELPHIA.

Nov. 4.

While there is a fair amount of new business coming in, the strength of the present market is due largely to old orders. There is a feeling that prices are high and many buyers show a disposition to await developments. This has been especially

true recently on account of the approaching election and now that the results are known, business will be benefited..

PIG IRON.—Shipments of foreign iron dropped off during October on account of the demand for vessel room for coal. The settling of the anthacite strike will give more vessel tonnage for iron. The inability of the railroads to meet demands upon them is the worst feature of present conditions. Coal and coke are about as hard to get as at any time during the strike on account of the railroads not being able to furnish engines and cars. Prices are irregular. Very little American iron is being sold and prices of foreign are about as follows: Cargo lots, c. i. f., at about $19.50 for Middlesboro No. 3; small lots, $20.50 to $21; Scotch, $22.50 to $23.50, all delivered alongside ship.

BILLETS.—The market is unsettled. Foreign steel is selling at $28 to $29. Domestic is somewhat lower, but some special steels are selling from $33 to $35.

FINISHED MATERIAL.—Plates have almost the only strong position, as other lines are showing signs of weakness. Iron bars are selling at 1.85c per carload lots and probably lower for desirable business. Steel bars are selling at 1.75c to 1.80c. Deliveries can now be made on almost any kind of structural material with reasonable promptness. We quote as follows: Plates, small lots, 2.10c to 2.15c; carload lots, ¼-inch and thicker, 2c to 2.05c; universal plates, 2c to 2.05c; flange, 2.10c to 2.20c; fire box, 2.25c to 2.30c; marine, 2.30c to 2.35c. Next year's deliveries of structural steel are quoted at 1.72c to 1.80c, and prompt shipments mill specifications 2c to 2.20c. The official figures, based on Pittsburg quotations, are 1.72c to 1.80c, but deliveries may overrun the current year.

OLD MATERIAL.—The market will not bear much pressure, but scrap that is wanted brings fair prices. We quote as follows: Old steel rails, $21.50 to $22; miscellaneous heavy steel scrap, $20.50 to $21.25; low phosphorus scrap, $27 to $28; old steel axles, $25.50 to $26.50; old iron axles, $30 to $31; old iron rails, $24 to $25; old car wheels, $19.75 to $20.25; choice scrap RR No. 1 wrought, $23.50 to $24; country scrap, $21 to $22; machinery cast, $19.50 to $20.50; No. 2 light scrap (forge) $16.50 to $17; No. 2 light scrap (ordinary) $14 to $15; wrought turnings, $16 to $16.50; wrought turnings, choice heavy, $17 to $17.50; cast borings, $10 to $10.25; stove plate, $15.50 to $16.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM NO. 150 NASSAU ST., Nov. 4.

PIG TIN.—During the week the market was quiet, with prices a shade easier than in the previous week. As a whole the market has been conspicuous for its firmness. A principal factor has been the gratifying condition disclosed by the October monthly statistics, which showed the total visible supply to be 16,053 tons, against 18,026 tons in September. At present the American visible supply consists of 3,459 tons in spot, and 2,024 tons afloat. This is thought to mean that requirements for the coming month will have to depend upon London, where the market conditions have been almost the same as here. Closing prices at the Metal Exchange today were as follows: Spot, 26.60c to 26.70c; November, 26c to 26.50c; December, 25.75c to 26.25c. London closing prices today were as follows: Spot, £120 7s 6d; futures, £118 10s.

COPPER.—Throughout the week the copper market has been extremely dull. Buyers are out of the market in a more emphatic way than for sometime past. Stocks are accumulating to an enormous extent, the increase during September being 8,486 tons. On the first of July last when the accumulation began the visible supply amounted to about 99,000 tons, while on October 1 it had increased to 119,266 tons. In some quarters surprise is expressed that prices have not receded more. In London the market has been weak under free offerings. The exports for October amounted to 11,904 tons making the total exports for the ten months ending October 31, 142,356 tons, compared with 77,221 tons for a similar period last year. Only nominal quotations can be had, and they are as follows: Lake, 11.62½c to 11.95c; electrolytic and casting, 11.60 to 11.75c; standard, 11c. London prices are as follows: Spot, £52 3s 9d; futures, £52 8s 9d.

PIG LEAD.—The demand has been of the moderate order, on the basis of 4.12½c for lots of 50 tons or more. In St. Louis prices remain without change on limited trading. A similar condition is noted in London, where prices continue at £10 5s.

SPELTER.—On free offerings spelter is easier at 5.40c for spot, and 5.35c for futures. In St. Louis offerings have been large also, forcing prices down to 5.15c. The London market is without particular interest, and remains unchanged at £19 5s.

ANTIMONY.—Under a moderate demand Cookson's has been selling at 9½c, Hallett's at 7¾c, and other brands at 7¼ to 7½c.

NICKEL.—Unchanged. Prices average 40 to 60c, according to quantity.

QUICKSILVER.—Jobbers only are in the market, and sales have been made on the basis of $48 per flask in lots of 100 flasks. London, £8 15s.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, Nov. 4.

Though there is a good demand for metals there is some weakness in prices, which fluctuate from day to day. Copper and pig tin are stronger this week; spelter is without change. We quote jobbers' price to consumers as follows: Lake copper, carload lots, 12¼c; less than carload lots, 12½ to 12¾c. Pig tin, 27½c; pig lead, carload lots, 4.10c; less than carload lots, 4½c. Sheet zinc, carload lots, 6½c, and 6.65c in lots of 600 pounds. Spelter, carload lots, 5.35c; less than carload lots, 5¾ to 6c. Antimony, 10¾ to 11c for Cookson's and 9¾ for Hallett's in small quantities. Nickel, 55c to 65c, according to size of order and delivery. Demand for old metals is good. Selling prices of dealers are as follows: Copper wire, $10.50; heavy copper, $10.50; light copper, $9.50; red brass, $10.62½; yellow brass, $8; light brass, $6.75; lead pipe, $3.90; zinc, $3.75.

Two New Blast Furnaces at Sharpsville.

(Special Telegram.)

PITTSBURG, Nov. 5.—The Shenango Furnace Co., of this city, operating three furnaces at Sharpsville, Pa., has decided to erect two additional stacks in the immediate future. Plans are now being prepared and it is probable that they will be 80x20 feet and will have a daily capacity of about 400 tons each. The furnaces will operate exclusively on Bessemer iron and the product will be disposed of to independent steel manufacturers by the firm of W. P. Snyder & Co. During the past month the latter concern has invested heavily in iron ore properties in the Lake Superior region and has also purchased a very large tonnage of coke for delivery throughout next year. Work on the two stacks will be commenced at an early date, but owing to the scarcity of building material it is not probable that they can be completed short of 1904. With these furnaces in operation the Shenango Furnace Co. will have a daily output of about 1,500 tons, all of which will be available for the independent steel trade.

The Reduction in Tin Plates.

(Special Telegram.)

PITTSBURG, Nov. 5.—The reduction in price announced by the American Tin Plate Co., from $4 to $3.60 a box, only applies to orders for plate dating back to last Monday and for delivery after Dec. 1. Some changes have also been made in the differentials for charcoal tins, terne plates and other products of the company, but the new list has not yet been made public.

Hardinge Bros., 1036 Lincoln Ave., Chicago, manufacturers of the Hardinge sensitive drill press, drawback chucks, watchmakers' and machinists' tools, etc., have bought the plant, good will and business of the A. W. Gump & Co., Dayton, O., manufacturers of the Cataract precision lathes and attachments, formerly made by the Cataract Tool & Optical Co., of Buffalo, N. Y., whom A. W. Gump & Co succeeded. All the machinery of the latter company's plant will be removed to Chicago and installed in the shop of Hardinge Bros., which will be further increased by the addition of another story to their present building.

A company with $50,000 capital has been organized at Warren, O., to manufacture sheet metal goods. The incorporators are William Wallace, W. C. Winfield, C. B. Selby, C. A. Crane, of Warren, and C. O. Hart, of Chicago.

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IRON AND STEEL IMPORTS AND EXPORTS.

The report of the Treasury Department for September shows that the importing of pig iron is still increasing, the imports being 2,749 tons more than for August. The increase is not, however, at so rapid a rate as for the month of August, when imports were 17,291 tons more than for July. The imports of steel were smaller than for any month this year since May. The following table shows the pig iron and steel imports since Jan. 1. The column of steel includes ingots, blooms, slabs, billets and bars of steel and steel "not elsewhere specified," structural steel being thus included:

IMPORTS OF PIG IRON AND STEEL—GROSS TONS.

	Pig Iron.	Steel.
January	7,633	5,312
February	8,007	2,235
March	18,184	6,570
April	19,067	13,005
May	30,508	24,388
June	32,258	35,588
July	62,106	36,124
August	79,447	39,027
September	82,196	27,726
	339,406	189,975

The following table gives in detail the imports for September and for the nine months ending with September:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES. GROSS TONS.

	September,		Nine months ending September,	
	1901.	1902.	1901.	1902.
Pig Iron	5,684	82,196	33,965	339,406
Scrap	2,082	12,079	15,002	75,488
Bar Iron	1,804	6,547	14,298	21,124
Iron and Steel Rails	19	11,560	890	35,023
Hoop, band or scroll	884	117	1,688	8,184
Steel Ingots, Slabs, Billets or bars	518	27,726	5,753	189,975
Sheets and Plates	611	470	3,596	4,726
Tin and terne plates	8,515	4,396	50,643	46,871
Wire Rods	1,189	1,337	12,773	14,108
Wire and Wire Articles	122	154	2,388	2,446
Total	21,418	146,582	140,986	736,227

The decrease in the imports of hoops, sheets and plates, and tin and terne plates for September as compared with September, 1901, is noteworthy. The total value of iron and steel imports for September, not including ore, was $4,386,189 against $1,847,384 for September, 1901. For nine months the total was $27,842,949 against $14,057,766 to the end of September, 1901. Iron ore imports in September were 98,959 tons against 115,618 tons in September, 1901, and for eight months 895,237 tons against 724,676 in 1901.

Exports for September were 9,036 tons less than for August and 17,853 tons less than for September, 1901. For the nine months the total values were: For 1902, $73,351,735, and for 1901, $76,846,899. For September, the total was $7,446,906 against $7,500,520 in September, 1901. The following table shows exports in detail:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES. GROSS TONS.

	September,		Nine months ending September,	
	1901.	1902.	1901.	1902.
Pig Iron	2,161	1,298	48,989	23,501
Scrap	1,153	1,019	10,672	7,778
Bar Iron	559	1,859	15,935	18,719
Wire Rods	672	496	4,388	15,246
Steel Bars	1,442	639	21,619	7,645
Billets, Ingots and Blooms	50	270	27,103	2,064
Hoop, Band or Scroll	5	80	1,010	1,395
Iron Rails	206	23	812	210
Steel Rails	17,442	3,035	266,723	68,071
Iron Sheets and Plates	363	197	5,681	2,860
Steel Sheets and Plates	368	1,029	21,308	11,677
Tin plate, terne plate and taggers tin	9	79	416	1,374
Structural material	4,709	4,122	40,932	45,970
Wire	7,713	5,202	61,525	72,006
Cut Nails	471	402	8,029	5,500
Wire Nails	1,971	1,704	15,358	19,398
Other Nails, including tacks	154	131	1,397	1,388
Total	39,448	21,595	551,869	299,790

Appeal from the Billet Duty Decision.

(Special Correspondence.)

NEW YORK, Nov. 5.—The billet decision of General Appraiser Jewell, as reported in these columns last week, has been appealed to the board of general appraisers who will hear it in New York on Thursday, Nov. 6. The decision that German billets imported into this country shall be assessed at 86 marks, and some as high as 88 marks, seriously embarrasses the importers. It keeps the duty at $6.72, it is true, but it compels them to pay a penalty of 24 percent for alleged undervaluation, this consisting in valuing the steel at exactly the price they paid for it. The appraiser insists that in order to escape the penalty of undervaluation they must swear to a price above what they paid.

Youngstown Iron Sheet & Tube Co.

Plans are maturing that look toward increasing prominence and scope for the Youngstown Iron Sheet & Tube Co., of Youngstown, O. No successor has been elected as yet to Geo. D. Wick, who gave up the presidency of the company some months ago, but there are some negotiations on foot that may end in the identification with the company of Col. Frank J. Hearne, until recently president of the National Tube Co. Should this come about Col. Hearne will no doubt become president of the Youngstown company. The sheet and tube mills are now running to full capacity, and work is in progress on the new open-hearth department, the erection of the building being in the hands of the McClintic-Marshall Construction Co. The plans now under discussion contemplate the building of two modern blast furnaces and possibly the extension of the company's lines to include structural steel. Some time ago it acquired a large interest in 6,000 acres of coal land in West Virginia and plans to build its own coke ovens. Its coal supply is sufficient to furnish coke for three blast furnaces (including the Alice Furnace at Sharpsville, Pa.) for 25 years, and the Mesabi ore properties acquired early this year represent a 20 years ore supply.

It is reported that fifteen creditors of the Ohio Rolling Mill Co., at Findlay, O., have decided to take stock in the company and to reopen the mill about Dec. 1. The largest unpaid claims outstanding are held by Cleveland and Toledo business men. The mill gives employment to about 200 men.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

At the regular monthly meeting of the Pittsburg Foundrymen's Association, held at the rooms of the Engineers' Society of Western Pennsylvania on Monday evening, Nov. 3, the subject under discussion was "Coke." Inasmuch as this product is causing foundrymen much annoyance at the present time the subject was generally discussed both by the foundrymen and coke agents. Interesting papers on the subject were also presented by N. P. Hyndman, of the Washington Coal & Coke Co., and Charles H. Stroh, of the American Locomotive Works, while S. D. Sleeth, of the Westinghouse Air Brake Co., talked interestingly.

Mr. Sleeth spoke briefly of his experiences with cokes high in sulphur, and said that they had produced soft castings successfully with coke running as high as 1.65 and 1.71 in sulphur, despite the fact that most foundrymen insist on holding their sulphur down to .65 and .75. He said that his success with this high sulphur coke no doubt was due to the large amount of limestone used in the flux, which took up the greater portion of the objectionable sulphur. He further cited an experience with light coke which is out of the ordinary. It ran as high as 88 in fixed carbon, 10 and 11 in ash and about .85 in sulphur, and did not require as much coke in weight, the bulk being the same, to produce a given amount of castings as the heavier coke. Analyses of coke taken from the bottom, center and top of the ovens, showed very little difference, although it is the general impression among the trade that coke taken from the center is much more desirable than coke taken either from the top or bottom.

The question of 72-hour coke was discussed at length. Mr. Howard Hooker, of Rogers, Brown & Co., stated that it is an absolute necessity, owing to labor conditions, for the coke manufacturers to produce this kind of coke over Sunday, and it was suggested that possibly this was considered the best coke on account of the conscientious scruples of the coke workers in refusing to draw the ovens on Sunday, which is the case in the Connellsville region. The discussion waxed warm, and none of the foundrymen present were absolutely certain that they could recognize 72-hour coke, although insisting on its delivery for their foundry use. G. P. Maury, of the Metallurgical Laboratory, stated that he attempted to secure a sample of 72-hour coke for the purpose of making an analysis of the same, but found it almost impossible to secure it for the reason that none of the foundrymen in Pittsburg were certain that they had any on hand.

One of the foundrymen stated that a large stove foundry in Detroit is using by-product coke to good advantage, despite its dark appearance and structure. Some of the foundrymen stated that they had attempted to use this coke, but were not successful and had never repeated the experiment. It was stated, however, that there was a possibility that this kind of coke will be used more extensively for foundry work in the future, prejudice now militating against it.

The program committee reported a list of topics that will be discussed throughout the season 1902-1903 as follows:

December—"Facings—Sea Coal, Plumbago, Soap Stone and General Facings." January—"Fan Blowers." February—"Gates and Sprues." March—"Molding Sand." April—"Cores." May—Banquet or smoker. June—Held open.

Those in Attendance.

The attendance of both visitors and members was large. The following were present: E. D. Frohman and T. J. Fitzpatrick, the S. Obermayer Co.; C. A. Stroh, American Locomotive Works; R. A. Walker, *Iron Age;* S. D. Sleeth, Westinghouse Air Brake Co.; J. A. Schick; John Scott, Thomas Carlin & Sons; R. D. Fuller; Mr. Nichols; J. S. Seaman, Seaman, Sleeth Fdy. Co.; Mr. Jones; R. F. Barker; C.W. Winder, Westinghouse Machine Co.; W. J. Reardon; S. F. Warren, Pennsylvania Malleable Co.; J. Keegan; G. D. Springer, Pittsburg Pulley Co.; D. B. Adams, Hydraulic Machine Co.; C. W. Townsend, Thomas Carlin & Sons; J. Lane, M. Shenk, J. Demerley, and S. V. Slocum, Keystone Car Wheel Co.; Henry Hoffman, McKees Rocks Mfg. Co.; H. H. Hooker, and Mr. Armon, Rogers, Brown & Co.; A. O. Backert, *The Iron Trade Review;* H. J. Dorsey, F. A. Johns, and F. Baiern, Enterprise Foundry Co.; William Yagle, Wm. Yagle & Co.; W. J. Stever, Pittsburg Valve, Foundry & Construction Co.; Mr. Wallace; Paul Kreutzpointner, Pennsylvania shops, Altoona, Pa.; S. H. Stupakoff, the Fullman Co.; C. Wike, Hall Steam Pump Co.

Mr. Stroh's Remarks on Coke.

The following is Mr. C. H. Stroh's contribution to the discussion on coke:

The question of coke from the standpoint of the foundryman is an important one and opens a wide field for discussion.

During these brisk times it is next to impossible to secure really first class 72-hour coke, yet the coke manufacturers insist that the product has remained in the ovens for the stipulated period, that it is the best grade obtainable and that the highest price should be paid for the same. The foreman is confronted with an unusually high percentage of bad castings, and while not doubting the truth of the coke agents' statement, cannot help but believe that the coke he has been using is largely the cause of the big percentage of bad castings he is turning out. The coke agent usually claims that other conditions in the foundry are at fault, and it is always a wise policy to investigate conditions to ascertain whether the proper percentage of coke has been used and whether the blast is in proportion to the amount of coke used. If you are not using your blast and coke in the proper proportions you cannot possibly obtain the proper results. If the blast is too great in proportion to the amount of coke used, oxidization will result and will cause the iron to be too hard, while on the other hand if too much coke is used in proportion to the blast carbonic oxide is formed, causing blow holes, the cause of which we are so often asked to explain by the machinist.

Very few foundry foremen keep track of the coke that comes into the foundry from time to time and even the cupola tender often fails to report bad coke until he is nearly choked to death by the sulphur fumes while charging and tapping. Some time ago I had some difficulty with coke. The coke shipped was dirty and weak, showing deep dark ends or niggerheads and having flat pieces of slate running through it as large as a quarter of a dollar. Of course the coke agent insisted that it was 72-hour Connellsville coke, despite the fact that the sulphur fumes resulted in the cupola tender laying off on account of illness. Good coke is clean, bright and strong, and is high in fixed carbon and low in ash.

N. P. Hyndman on Coke.

Mr. Hyndman submitted the following paper:

I doubt if there is any other commodity used in foundry practice that is just at this time giving you more concern. The centralization of the iron and steel interests has brought about a consolidation of coke interests, the result of which is that the large producers of iron and steel are the owners of their own coke works. This ownership is the manipulation of years, the buying up of coking plants and undeveloped land, until now we find the great steel corporation so much in possession, and their requirements of coke so large, that they have announced to the general foundry trade, through their coke department, the necessity of withdrawing their present production of foundry coke after this year. This is the reason, I say, that the matter of coke supply is no doubt causing some of you much anxiety. You perhaps have had a regular source of supply for years, of a quality that suited your work, and you must now look elsewhere and enter the experimental period again. The development of coke production has been so extensive in the last five years that I do not think you need fear any trouble in securing the quantity you want. In fact there are now about 3,000 ovens under construction, or contemplated, in this State, and most of these in the Pittsburg and Connellsville regions.

About the year 1885 our esteemed fellow citizen, Mr. Frick, the largest producer of Connellsville coke, commenced to buy out his competitors, and continued doing so until he had secured a large part of the developed properties and coking coal land in the region. The result of his action is the extensive coke supply of the United States Steel Corporation today. Within the last five years a large addition has been made to the number of coke works in Fayette and Westmoreland counties, Pennsylvania, by the large consumers and new investors. These developments are principally in the "Klondike" or Lower Connellsville district. Some of them have become the property of the United States Steel Corporation, while a number of other plants there are operated by individuals. Increased de-

velopments have also been made in the Greensburg and Latrobe districts.

Quality is the most interesting part of the subject to you, no doubt. Previous to ten years ago the consumers demanded coke made in the Connellsville region between Mt. Pleasant and Uniontown, as they considered that the heart of the region, and thought only there could coke of satisfactory structure, hardness, and chemical analysis be found. They insisted sulphur should be .75, or not to exceed .85. Even in that section of the coke region the producer tried to impress you with the fact that the deeper the coal the better the coke. This may be true, but it did not prevent the drift mine producer from selling his coke at all times and in the same markets.

The development of coking coal lands adjoining the field above described was afterwards commenced, and coke from the north end of the Connellsville region and the Greensburg field was accepted with favor. The quality of coal seemed to be satisfactory for coking except that the sulphur in some of it was higher than the trade would accept. This, however,, was corrected by the coal washing process. The lower end of the Connellsville field, south of Uniontown, produced a coke that was said to be wanting in strength, but this impression is not held today.

The next field to come into prominence was the Masontown field in Fayette county, now called the Klondike or Lower Connellsville. Previous to five years ago no effort had been made by the farmers to sell these lands, but about that time some Pittsburg capitalists, anticipating an increased demand for coke, invested largely in this field, and it is today a beehive of activity in coke production. Two trunk line railroads enter the field, with additional railroad facilities to be provided. This coke is being shipped all over the country and used for all purposes. The quality is good. The same condition exists there as in all other coke territory, viz., that you may find some coal with sulphur a little higher than desired. This, however, if continuous, may be corrected with a washer. No washers, however, are in use there now.

I now want to speak of the quality of coke in general. The demands on the shippers for sulphur of .75 to .85 has not been continued during the last few years. We find the foundry consumers are as willing to accept coke with 1 percent sulphur as they were to accept .75. Whether the former demand was based on prejudice, or that you have introduced such methods in your foundry practice as will enable you to use higher sulphur, I do not know. The foundry coke shipper and his customer sometimes get into a controversy about quality of coke, judging from its appearance, and the objectionable feature may be nothing more than black tops. I have been asked to go miles to see such coke, with the expectation on the part of the buyer that I will acknowledge it inferior, and almost pay him to keep it. The fact is the coke was hard, thoroughly burned, and in every way first class. The discoloration is the result of overheating of the oven, which melts the coal too suddenly, forming a crust over the top, which prevents the gases from escaping. These decompose and leave a deposit of lamp black in cells of forming coke. The result is "black tops." We also have in the manufacture of coke "black butts," which we acknowledge are objectionable, owing to the fact that the coke is not thoroughly burned, therefore soft. This coke is found at the base of the oven, due principally to insufficient heat in that part of the oven, and this may be caused by dampness in the earth on which the oven is built, or from exposure of the empty oven before charging.

It is surprising the number of people interested in the consumption of coke, living remote from the coking coal fields, who are ignorant of its mode of manufacture. You have had this subject presented to you very intelligently through the writings of your esteemed associate, Thos. D. West, and through the coke expert, John Fulton. I assume, however, that a concise explanation of the process in this paper would not be amiss. The style of oven principally used in this country is the bee-hive type. The by-product type is being introduced, but the preference in America to date seems to be for the bee-hive oven. These remarks therefore refer only to the latter. They are built in solid rows of any number consistent with the character of the surface of the ground. They may be "bank ovens" (single row built against a hill) or block ovens (double row on open ground). The coal is carried to them in "larries" holding enough coal to charge the oven, and running on a track built on top of the row of ovens. The coal is charged from the larry into the ovens through a hole in the top. The process of applying the heat is where we find many people mystified, or laboring under a wrong impression. When the oven is new the heat is applied by burning wood until the bricks get thoroughly hot. The oven is then charged with coal and ignites. The burning is from the top of the oven to the base. When the coke is ready to draw, the door in front of the oven is opened, and the cooling process started. This is done by quenching with water through a hose pipe, manipulated by the drawer. When cool enough to handle the drawer pulls the coke out on the yard with a large iron fork, finishing the quenching outside, as too much water permitted in the oven would tend to reduce the heat. As soon as possible after the oven is emptied it is recharged from the larry, with the same quantity of coal as before, and the burning process commences instantly from the heat of the oven. This continues during the entire period the oven is in operation.

Coke is burned 48 to 72 hours—48 hours because a certain quantity of coal will burn in a certain sized oven that length of time with best results to produce the highest quality of coke for blast furnace use. The 72-hour coke, being burned longer, is harder, and consequently of better quality, and is specially adapted to foundry practice.

The abnormal trade conditions existing today between the coke seller and buyer, as to price, are causing much anxiety as to the future. Those of you who have contracts and are being regularly supplied probably do not realize the condition I refer to. Owing to the anthracite strike, and the inability of the railroads to move the coke promptly, a great scarcity has existed throughout the country, with the result that prices ranging from $8 to $14 per ton at ovens have been freely paid for foundry coke for spot shipment, in quantities ranging from 1 to 100 cars. Never in the history of this country has such a state of affairs existed before. Normal conditions would now soon apply if the railroads could promptly move the coke produced. I predict that with better railroad facilities, together with the increased production of coke, the consumer can expect prices that will more nearly conform to the prices of iron.

Personal.

B. McKeown, of Youngstown, O., has been appointed superintendent of the Oxmoor furnaces of the Tennessee Coal, Iron & Railroad Co.

J. H. Fisher, general manager of the Jessop Steel Co., of Sheffield, Eng., arrived in New York last week and immediately left for Washington, Pa., where his company has nearly completed the erection of a large crucible steel plant.

Edmund C. Converse, one of the members of the executive committee of the United States Steel Corporation, has been elected a director of the United States Realty & Construction Co., of New York.

W. H. Gibbons, formerly president of the Parkesburg Iron Co., of Parkesburg, Pa., has been elected president of the Eastern Steel Co., of Pottsville, Pa.

Philetus W. Gates, who has been manager of the Gates plant of the Allis-Chalmers Co., was elected third vice president of the company and was made general superintendent of all the works, at the last quarterly meeting of the board of directors. The latter is a new office created at the meeting. Mr. Gates will continue to make his headquarters in Chicago.

David Tod, who has been connected with the Brier Hill Iron & Coal Co. as cement works manager, will resign that position to become manager of the cement works of the Struthers Furnace Co., Struthers, O.

Carl Landen, an engineering expert of the Grangeburg Iron Works, Sweden, is now in the United States. He has been visiting the Lake Superior region.

J. R. Houston, formerly of the Norton Iron Works, Ashland, Ky., has been elected secretary of the Laughlin Nail Co., Martins Ferry, O., succeeding F. K. Dixon, who resigned to engage in the hardware business.

The name of the Central Car Wheel & Castings Co. of Pittsburg is to be changed to the Central Car Wheel Co.

THE BATH WATER GRINDER.

The accompanying views are of the Bath water grinder of recently improved type. The wheel head is gibbed to a vertical slide, which provides rigidity in any position. The vertical arm which carries the head can also be clamped in its bearings, if desired. The head may be adjusted above center or below, and a micrometer adjustment has been provided. The top portion of the vertical arm is threaded, and moved by a combined hand wheel, nut and dust cap. A thrust arm prevents axle movement of the dust cap nut. To this arm is also attached an idler pulley arm, which can be clamped rigidly or allowed to vibrate. It is keyed to prevent turning.

Provision has been made for the use of water on the machine. The wheel head carries an adjustable hood and as the wheel becomes reduced in size, it can be moved back or detached. The knee and frame of the machine are so constructed that all water returns by the trough, shown around the base of machine, to the tank. This attachment is designed to carry away all the water and avoid any slop around the machine.

The swivel plate has two slots which enable the head and footstock and attachments to be removed from the table without interfering with the head of clamp screw, which preserves the set alignment of the swivel plate. The two slots are also useful in clamping surface work.

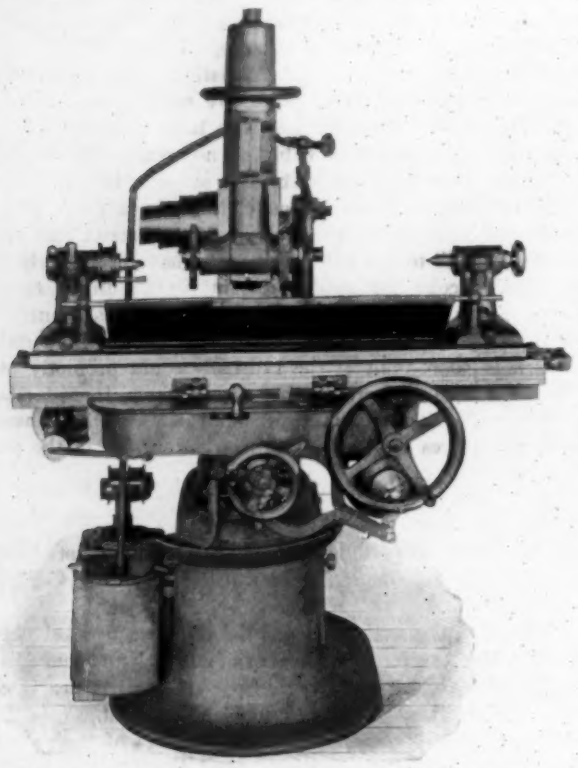


FIG. 1—BATH GRINDER ARRANGED FOR CIRCULAR WORK.

Fig. 2 shows the knee swung around the column in position for surface work, also the new gear longitudinal automatic feed. The feed is driven from a drum above in the countershaft to a cone pulley at side of knee. When in use for cylindrical work the belt runs on large step of cone, and for surface work on small step, which gives the higher speed required for such purposes. The distance from the drum above to the cone is just the same, thus changing the belt according to knee position. The belt may also be removed from the cone if desired.

At the front of the bottom slide is an enclosed box apron having a removable top cover, so that all the inside mechanism of the feed can be reached.

Figs. 1 and 2 show the power cross feed attachment for surface work. It is so constructed that either one or two pawls may be engaged at the same time, and adjusted to give a fine or coarse feed. The feed may be quickly disengaged by the knurled knob back of the large hand wheel.

The machine is handled by Hill, Clarke & Co., of Boston, New York and Chicago, and The Charles G. Smith Co., Pittsburg representative.

FIG. 2.—BATH GRINDER ARRANGED FOR SURFACE GRINDING.

New Coke Ovens in Virginia and West Virginia.

In addition to those published in the article of last week showing new coke oven construction in the United States, we have the following memoranda of new or enlarged operations:

The Algoma Coal & Coke Co., Algoma, McDowell County, W. Va., has advised us that it will have 50 additional ovens, now under construction, in operation within a few weeks. The company has operated 175 ovens.

In Wise County, Va., the Stonego Coke & Coal Co. has 250 new ovens nearly completed; the Colonial Coal & Coke Co. has just completed 100 ovens and has 50 nearly completed; the Willetts interests are to build 100 ovens on lands purchased of the Norton Coal Co.; and Irwin & Kelly will build 50 ovens near Dorchester.

Plans have been made and contract awarded for the new plant of the Mossberg & Granville Manufacturing Co., of Providence, R. I. The works will be located at Pawtucket, R. I., and the main building will be 200x72 feet with an ell 98x48 feet. The structure will be two stories and of heavy mill frame construction. There will be a blacksmith shop, one story, 104x45 feet. The new building will adjoin the India Point branch of the New York, New Haven & Hartford Railroad, and will have excellent shipping facilities. The first floor of the building will be used for heavy machinery and a pattern shop, the remainder of the space for erecting, finishing and shipping facilities. The plant will be thoroughly equipped with electric power, and all other modern appliances. The company now employs 250 workmen at the Providence plant.

The American Sheet Steel Co. has purchased the old "Manhattan," a saloon at Canal Dover, O., and has renovated the whole building and fitted up a reading room for the young men who work in the company's mills. The best books of the day will be at the command of the employes. Every form of intoxicants will be strictly forbidden. Any citizen can secure the privileges of the reading room by paying a small fee. To the company's employes it is free.

The Walworth Run Foundry Co., of Cleveland, has increased its capital stock from $20,000 to $50,000.

Examples of the Latest Turret Practice in a Modern Lathe Factory.

We are glad to be able to present a series of illustrations showing the range of modern turret practice employed by a progressive manufacturer of lathes—a series that will form a valuable addition to the descriptive material we have already published in regard to other notable machine shops and their methods of handling work of this type. The accompanying illustrations were taken in the well known plant of the Lodge & Shipley Machine Tool Co., of Cincinnati, and to that firm and Mr. C. F. Pease, who is in charge of the engineering department, we are indebted for an opportunity of showing how the turret machine has been pressed into the service of lathe manufacture.

The first illustration, Fig. 1, shows the arrangement designed for the production of the finished piece seen on the forming block. One end of this piece is straight, turned to a shoulder with the box tool and then threaded with the die shown on the turret. The interesting part of this turret lathe setting, shown to the left and attached to the turret has a fluted guide on the end to ensure the production of a good smooth thread.

A special chuck is illustrated in Fig. 3 as designed for machining a casting of peculiar shape. The sliding chuck will allow of a double setting of the piece so as to bring either hub to the center of the lathe without removal of the casting from the chuck, each position of the work being obtained with positive stops to guarantee the relative distances of the machined surfaces. The chuck is shown in position for drilling and facing the short hub of the piece whilst the tools seen in place in the turret are for the turning and facing of the long hub. The full setting of the tools for this piece of work bores and faces the four hubs shown in the illustration and also turns and faces the long hub up to the shoulder at one chucking of the casting.

Fig. 4 illustrates the method of machining a casting, used on a friction device, which requires boring, turning, facing and the taper turning of the frictional surface. The roughing off

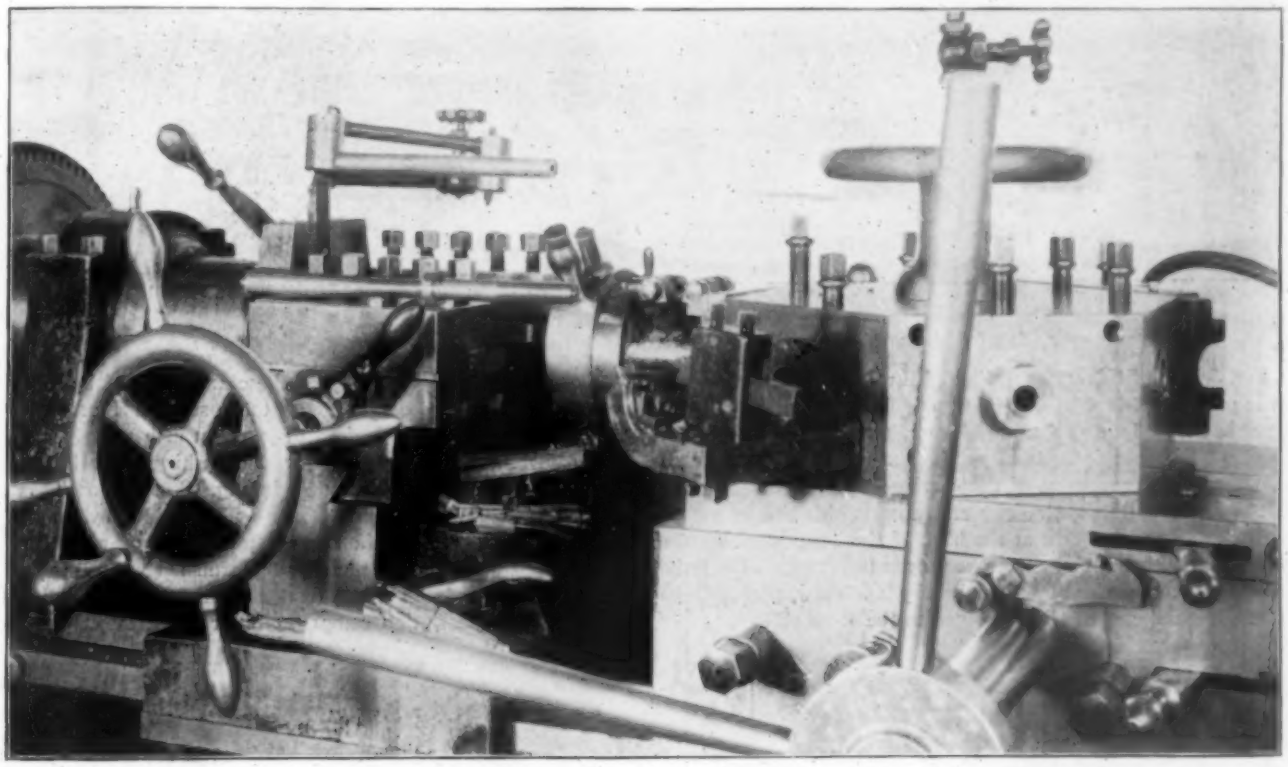


FIG. 1.—FORMING AND TURNING ATTACHMENTS

however, is in the forming of the taper and the curved end, which is accomplished by long flat double blades of the desired form and operated on both sides of the stock by means of a right and a left hand screw and pilot wheel seen on the left of the illustration. The chips lying on the machine immediately below the blades will give some idea of the rapidity with which the surplus metal is removed. The lever above the hand-wheel operates the cutting off tool which also rounds off the end of the finished piece.

A special turret is shown in Fig. 2. This tool is employed for boring and threading faceplates and machining other pieces requiring a large swing and having but a small operating diameter. The illustration shows a small faceplate in the chuck and the tools necessary for finishing the piece are seen in position in the turret. The hub is faced and turned by the tool mounted in the cross slide seen on the right hand side of the turret. The boring operations are handled by bars. One is shown just entering the hole in the piece of work. The roughing bar which preceded the operation seen under way is now located on the back of the turret. These bars take a bearing in the nose of the main spindle by means of a hardened steel collet in the spindle and a freely rotating sleeve on the end of the bar. The bars are fitted with double ended cutters of the size and shape of the hole desired. The large tap of the casting is done by means of the single tool seen on the cross slide at the extreme right of the illustration. The finishing of the inside taper surface of the friction is by the flat blades in the facing box on the near side of the turret and the edge and face of the piece is finished by the blades in the tool holder at the left of the turret, this last mentioned tool being shown in position ready for a cut. These several operations are all guided by pilot center pins entering the finished hole of the casting.

The finishing of a cone pulley is too frequently a time-consuming operation and in Fig. 5 the method in which the firm has managed to cut down the previous outlay of labor on this class of work is illustrated. The engraving shows the scheme by which the cone pulley is bored and finished all over the inside surface from the rough casting at the one chucking in a single operation, after the small end has been bored and reamed by other tools in the same turret. This tool holder receives two tools for each step of the cone, one for boring and another for facing the shoulder to the next step. The tools are set against adjustable stops, allowing the removal of any tool for sharpening and then returning to place without disturbing the adjustment. The pilot on the end of the tool holder is a rotating sleeve having a bearing in the finished bore of the pulley. The illustration clearly shows how the cone

pulley is chucked in order to be successfully driven against this heavy cut, even in the case of a pulley 24 inches in diameter. It will be understood that the cone pulley castings are rough turned on the outside to ensure a good fit in the chucking ring before undergoing this last operation.

the operations of boring, rough turning and finishing are illustrated in Figs. 7 and 8. In Fig. 7 the boring bar is in position to enter the casting. This bar is supported in the nose of the spindle by a hardened bushing and the cutters are double ended and of the diameter of the finished hole. A roughing bar and a

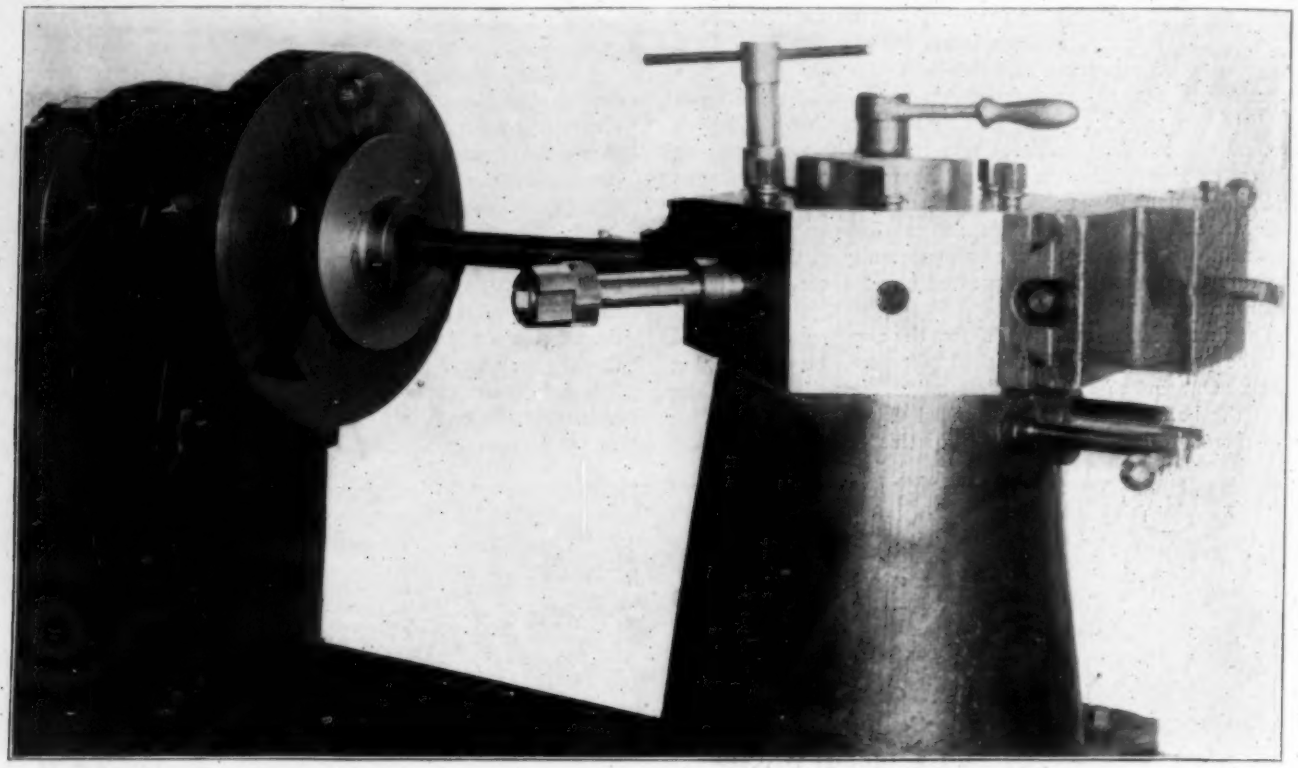


FIG. 2.—SPECIAL TURRET FOR LARGE SWINGS.

Fig. 6 is the finishing operation of turning and crowning the cone pulley. This work is performed while the pulley is on its own bearings in order to produce a truly finished piece of work. The multiple tools allow the turning and facing of all the steps by a movement of the carriage equal to the width of but one step of the cone. The crowning is obtained by means of the attachment shown at the back of the lathe in which the long slide with the end curving towards the front of the lathe is clamped to the shears and is thereby held stationary. There is also a small curved slide fastened to the cross slide, together with a supporting bracket for the long slide which is mounted upon and travels with the carriage and thus transmits to the cutting tools a movement which is equal to the radius of the curved slide.

finishing bar are employed and these are followed by a finishing reamer. The rough facing tools seen in Fig. 7 are so spaced that a cross slide feed of ¾ of an inch removes all the scale from the casting ready for the finishing operation which is performed by the tool shown in Fig. 8. This tool has inserted blades of the desired shape and is guided by a rotating pilot sleeve bearing in the reamed hole of the gear blank.

Fig. 9 illustrates the tools often furnished with a Lodge & Shipley engine lathe with turret attachment. The equipment seen in the illustration comprises die, reamer, tap, tap holder,

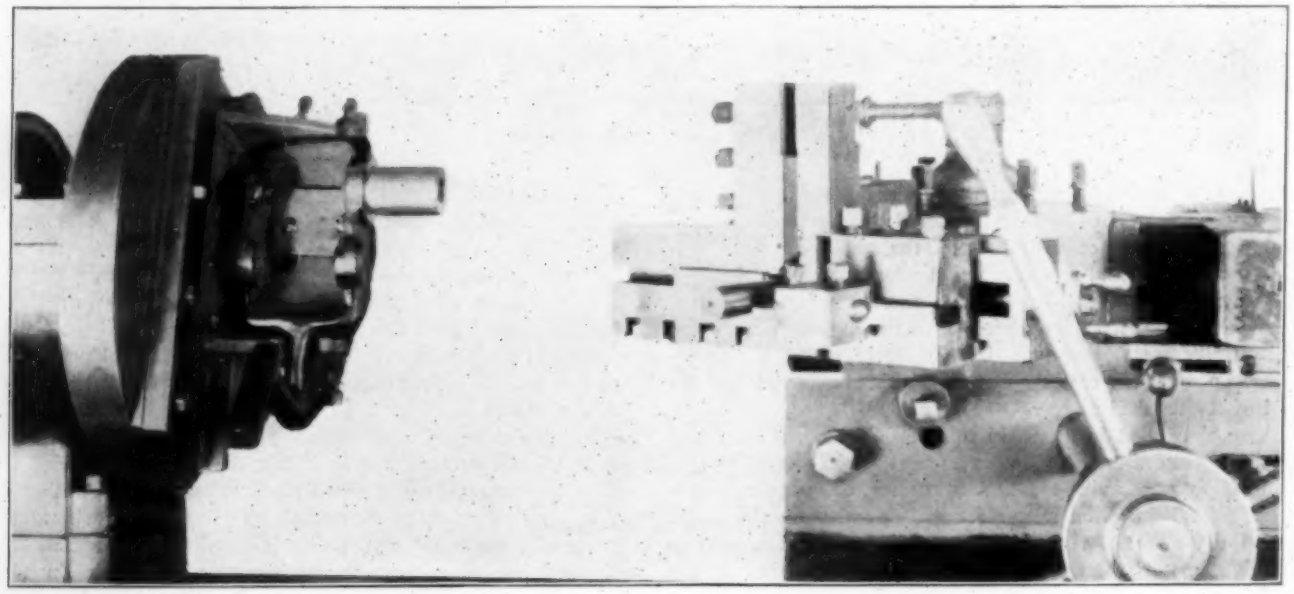


FIG. 3.—SLIDING CHUCK FOR DOUBLE SETTING OF WORK.

The devices designed for handling large gear blanks during

box tool and drill chuck. The tap holder is a simple but effective tool and will hold all sizes of hand taps from ⅜ inch to 1½ inches. One of the sliding bars used for this purpose is shown resting on the tool slide. It will easily be recognized by the sequence of square holes to fit the tap shanks.

FOR CONTINUED INCREASE OF THE ARMORED FLEET.

(Special Correspondence.)

WASHINGTON, Nov. 4.—The Naval Board of Construction is radically opposed to any interruption of the continuous authorization of new armored ships for the United States Navy. To emphasize its position in the matter, the board has just submitted to the Secretary of the Navy an official report in which emphatic objection is made to the suggested policy of the Congressional Naval Committees to restrict new construction. The Naval Board, in taking the opposite view, recommends that Congress be urged at the next session to authorize the construction of the following:

Two battleships of 16,000 tons trial displacement, eighteen knots speed, four 12-inch, eight 8-inch, twelve 7-inch and twenty 3-inch guns.

Two armored cruisers of 14,500 tons displacement, twenty-two knots speed, four 10-inch, sixteen 6-inch, and twenty-two 3-inch guns.

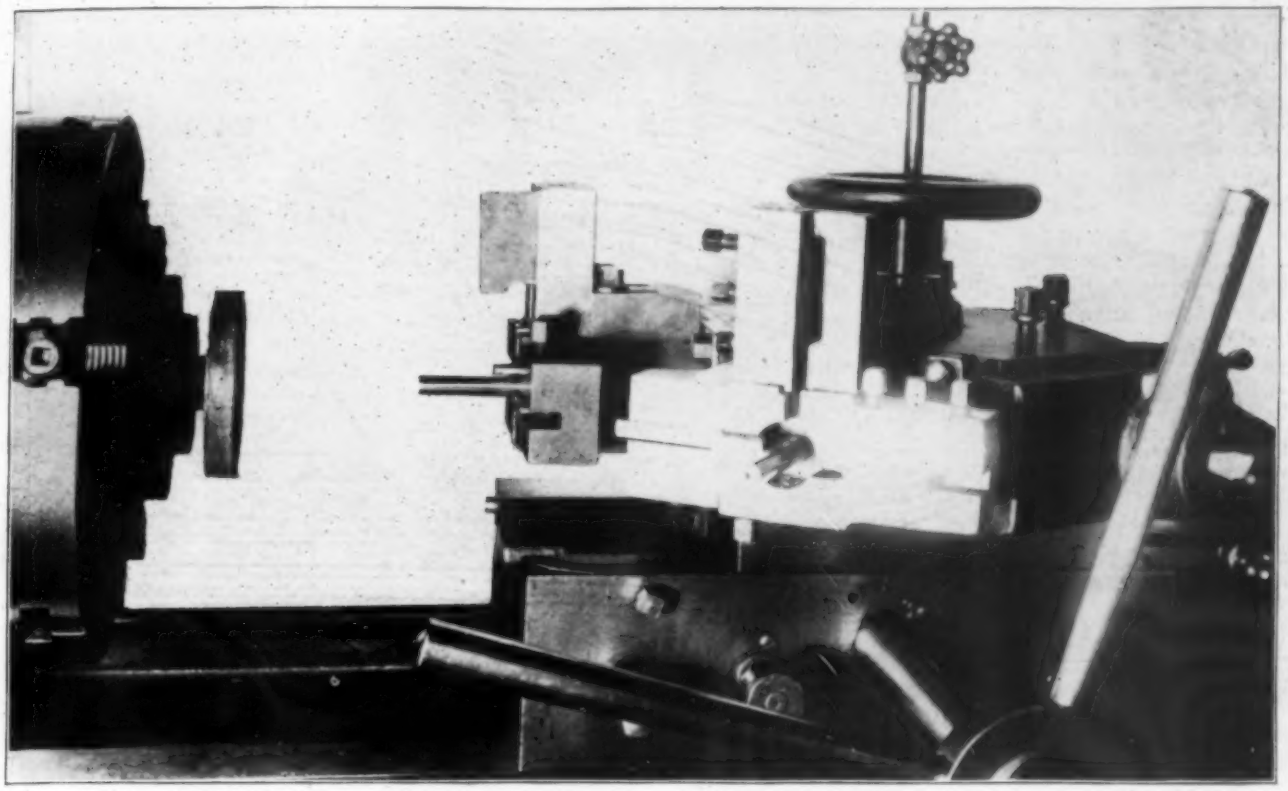


FIG. 4.—BORING, TURNING, FACING AND TAPER TURNING OUTFIT.

Two gunboats of 1,050 tons displacement, twelve knots speed and six 4-inch rapid-fire guns.

If Congress can be induced to authorize each year the construction of six vessels, the United States would have added at the end of four years 16 battleships, for the armored cruisers of the type just adopted are really speedy battleships. In 1906 the United States would thus have 28 vessels rated as battleships and 20 armored cruisers, rated as such—a force that would command international respect. President Roosevelt

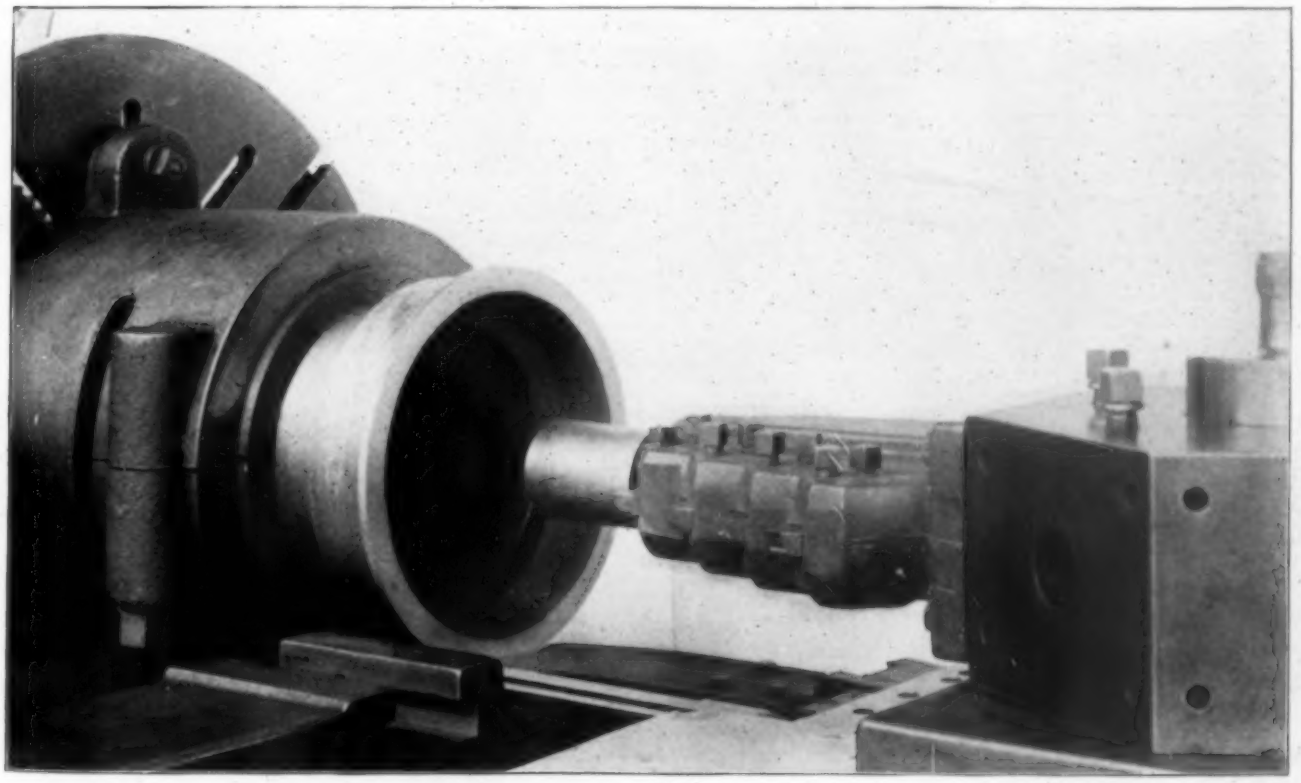


FIG. 5.—FINISHING THE INSIDE OF A CONE PULLEY BY MEANS OF SPECIAL CHUCK AND MULTIPLE TOOLS.

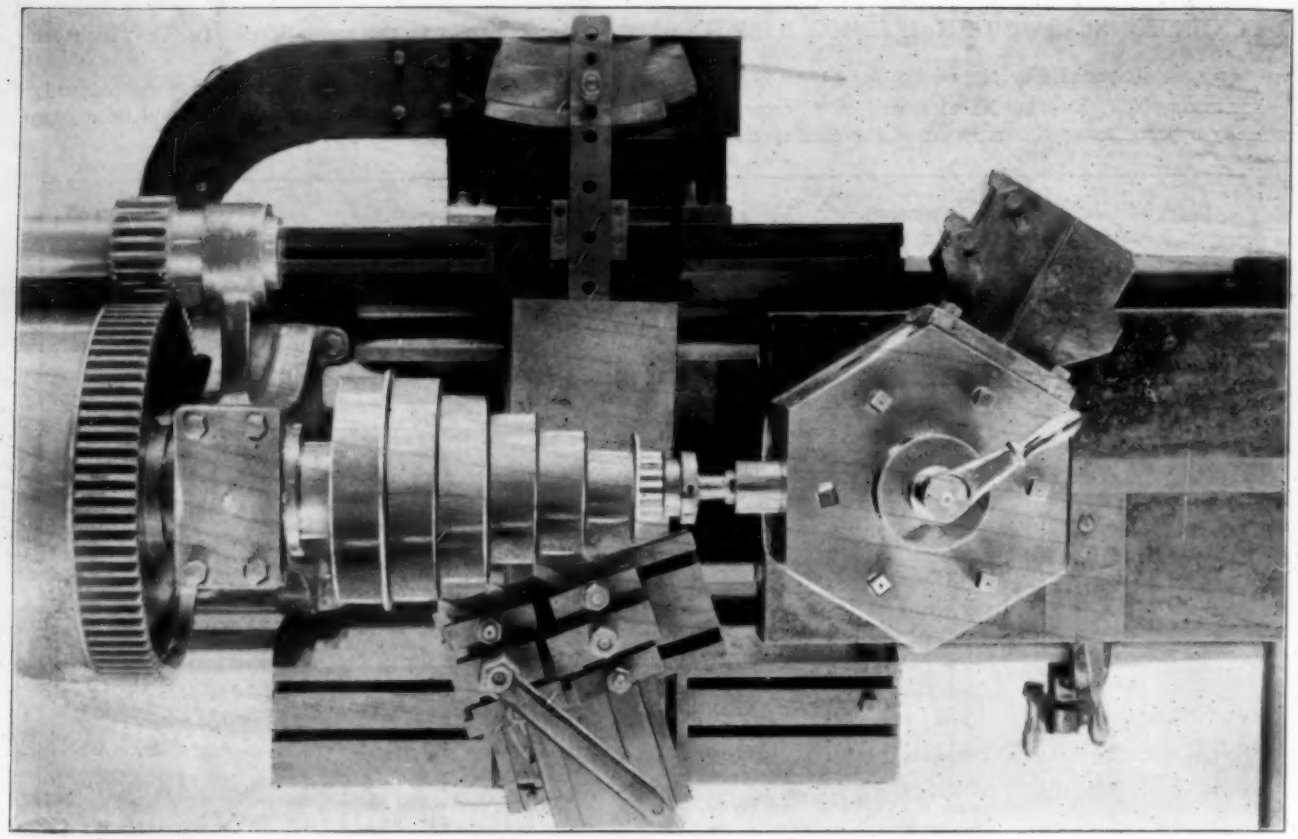


FIG. 6.—TURNING AND CROWNING CONE PULLEY.

and Secretary Moody are known to be in sympathy with these plans for the construction of heavily armored craft characterized by uniformity of design. Both officials believe that the United States should construct sea-going battleships, fast, heavily armored and of great steaming radius and not engage in the construction of craft designed merely for harbor defense purposes. The last naval appropriation bill was so cleverly worded that it allows the Navy Department to build four battleships instead of two battleships, and two cruisers. The appropriation for the cruisers is greater than for the battleships, owing to the necessity for supplying for the former engines of greater size and power. By reducing the steam power and increasing the armament, the intention of those who wanted four battleships is practically accomplished.

The Filer & Stowell Co.'s New Foundry.

The new foundry of the Filer & Stowell Co. of Milwaukee, Wis., now in process of erection, is located a mile south of the old plant. It will have connection with the C. M. & St. P. Railroad, as well as with the C. & N. W. Railroad, and will be connected with the old plant by a private railroad track. Two lines of electric cars will pass this property. It will be seen that the freight and labor facilities are all that could be de-

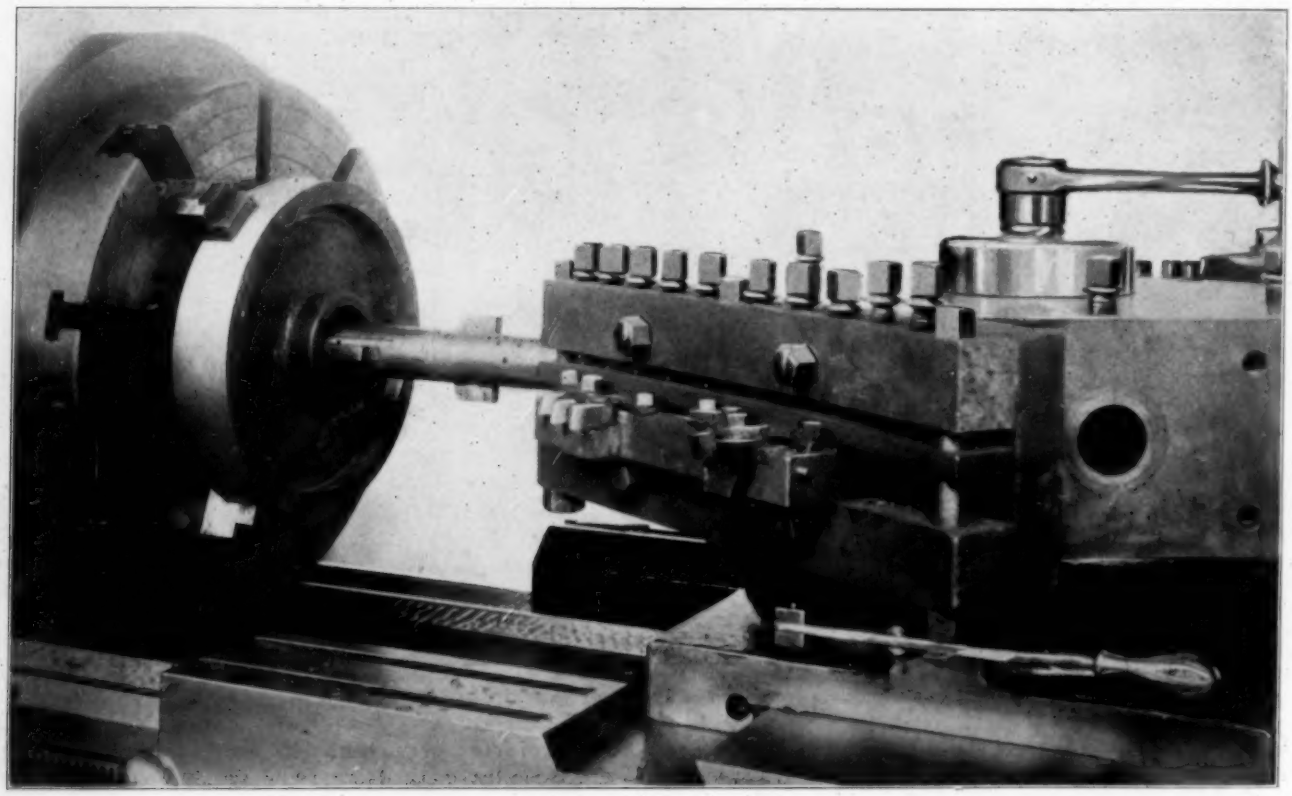


FIG. 7.—BORING AND ROUGH TURNING OF LARGE GEAR BLANK.

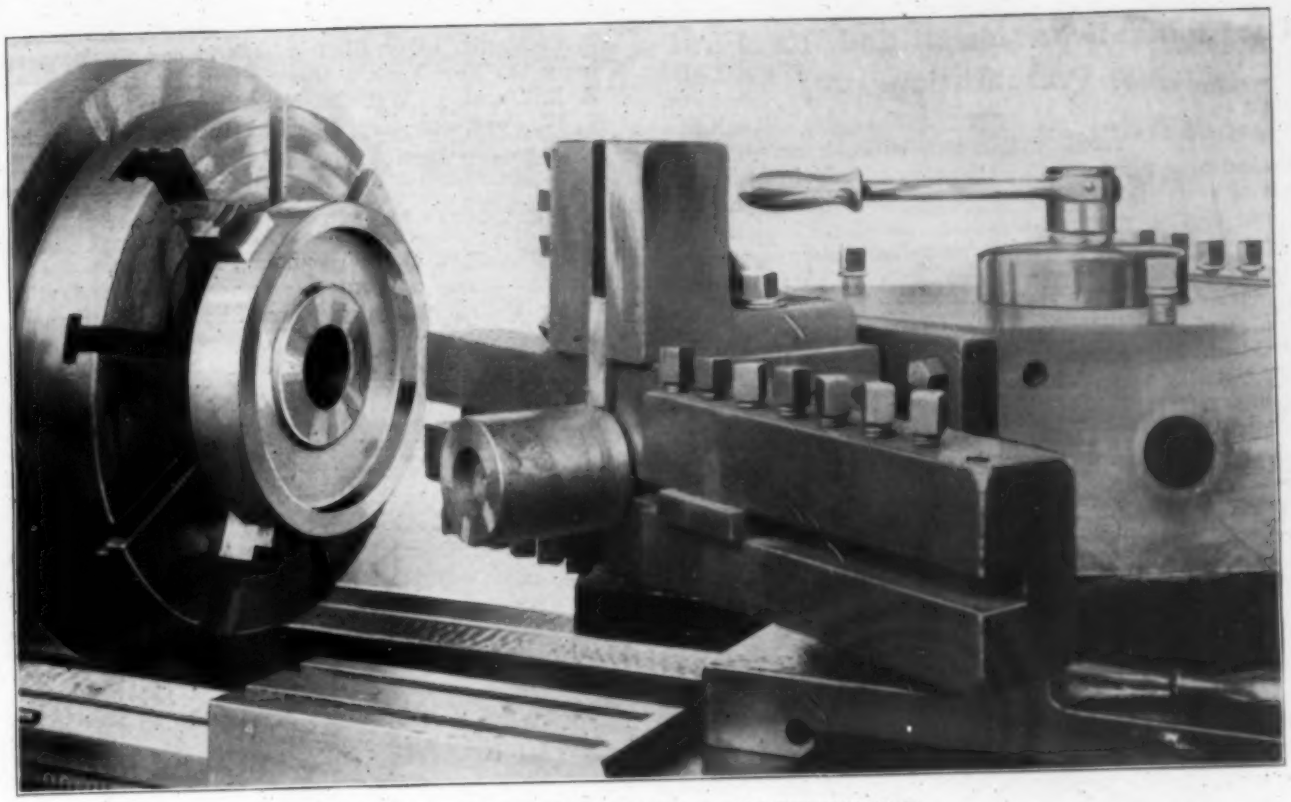


FIG. 8.—TOOL HOLDER EQUIPPED FOR WIDE FINISHING CUTS.

sired. The main building including ovens will be 245x400 feet, or 220x400 feet without the ovens. There will be two main spans of 85x400 feet, having a height of 36 feet to the crane hooks. The main spans will have three electric cranes with two 30-ton trolleys on each bridge. The wing will have three 15-ton cranes. The storage, coke and iron sheds will be elevated a foot above the charging floor, so that coke and iron can be trucked direct to the cupolas from the cars or from the sheds. Power will be furnished by a 300-horsepower compound condensing engine. Three independent water tube boilers will be used. At the cleaning end of the foundry a track will run across the shop so that castings can be loaded on cars from either one of the three spans. Every appliance that will add to the convenience or facilitate the work will be used. The estimated capacity of this foundry is 5,000,000 pounds of clean castings per month. The company owns fifty acres at the site where the new foundry is located.

The Indianapolis Brush & Broom Mfg. Co., of Indianapolis, Ind., reports a large and increasing trade in its "Capital" broom among machine shop and iron and metal working concerns. In two years this broom has come up from comparative obscurity to a point where it is specified in many of the largest requisitions.

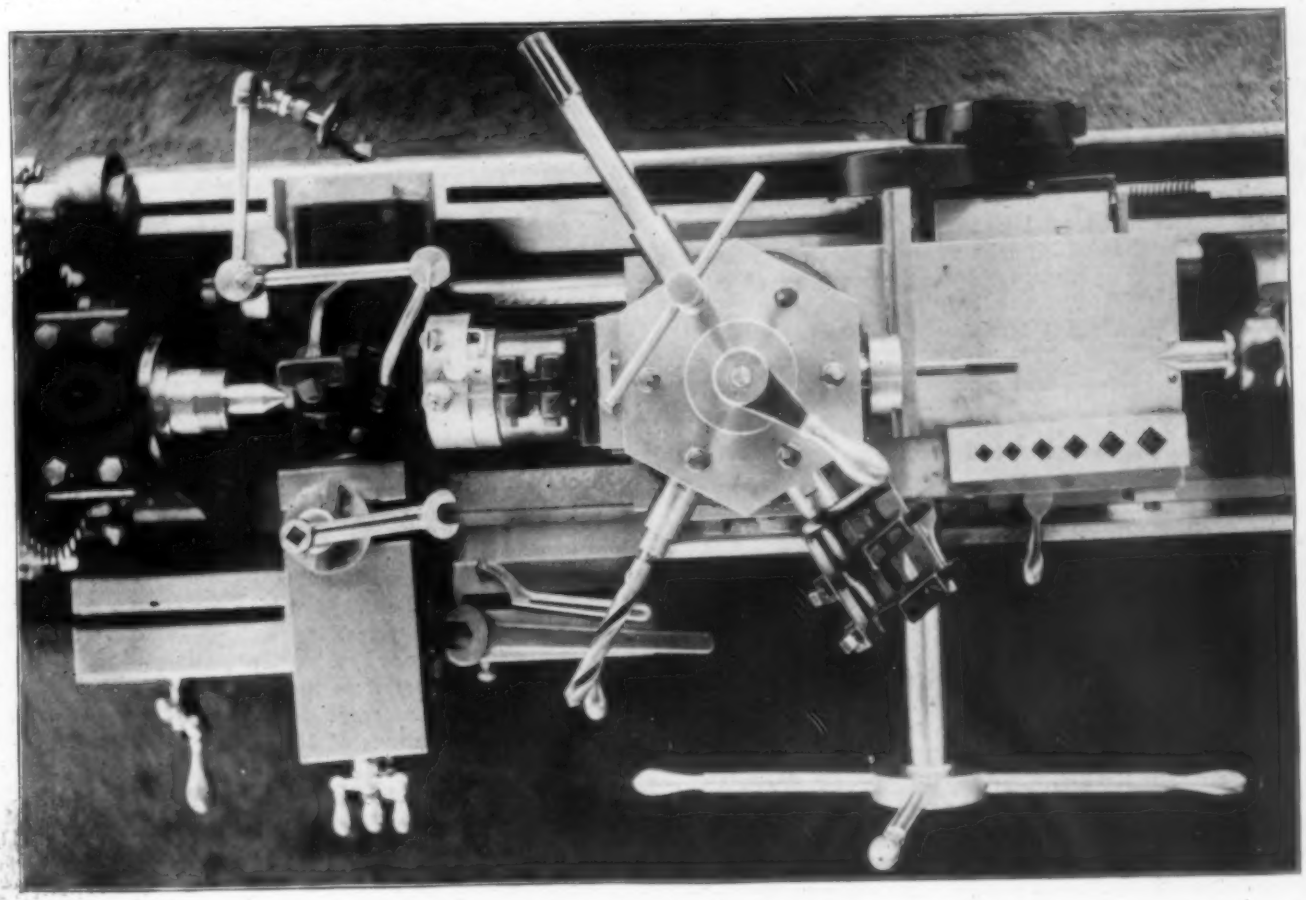


FIG. 9.—REGULAR TURRET ATTACHMENTS FOR A MODERN ENGINE LATHE.

The John Fritz Medal and Its First Presentation.

It falls to the lot of few men to be honored in so marked a way as was John Fritz, of Bethlehem, in the tribute just paid him by the foremost engineers of the country. The proposal to mark his 80th birthday in some way befitting so long and remarkable a career in iron and steel manufacture, had its inception at a meeting in New York some six months ago. Ten years previous, under the initiative of the late J. F. Holloway, then president of the Engineers' Club of New York, Mr. Fritz's 70th birthday was celebrated by 250 of his associates and friends at South Bethlehem, Pa. The meeting of last spring was called by S. T. Wellman, of the Wellman-Seaver-Morgan Engineering Co., of Cleveland, and was attended by a number of well known engineers and manufacturers. Out of it came the plan for the John Fritz memorial, with which Mr. Fritz's friends have been made acquainted in the past few months. It was decided to establish the John Fritz gold medal fund, and to have the contributors each give $10. The medal, it was decided, would be awarded each year to a person whom a committee adjudged to have made notable scientific or industrial achievement. The work has gone on in the past few months and 484 persons were represented in the fund raised. After the expenses of artist's work and incidentals were paid, there remained $4,000, the interest on which will be sufficient to purchase a gold medal each year.

Another feature of the plans of Mr. Fritz's friends was a dinner at which the establishment of the medal should be announced and at which subscribers to the medal fund should meet to congratulate the best loved man in the American iron trade, and the best renowned among its pioneers. Mr. Fritz's 80th birthday was observed quietly at his home in Bethlehem on Aug. 21. The time fixed for the dinner was Friday evening, Oct. 31, at the Waldorf-Astoria in New York.

The Committee and Its Work.

The general committee appointed to plan for the memorial and celebration was made up of the following well-known gentlemen:

President, S. T. Wellman, Cleveland.

Treasurer, John Thomson, 253 Broadway, New York.

Secretary, Charles Kirchhoff, editor the *Iron Age*, New York.

S. W. Baldwin, Pennsylvania Steel Co., Empire Building, New York.

N. H. Heft, New York, New Haven & Hartford Railroad, New Haven, Conn.

R. W. Hunt, The Rookery, Chicago, Ill.

F. R. Hutton, secretary A. S. M. E., 12 West Thirty-first St., New York.

C. Warren Hunt, secretary American Society of Civil Engineers, 220 West Fifty-seventh St., New York.

J. C. Kafer, 247 Fifth Ave., New York.

T. C. Martin, editor *Electrical World and Engineer*, 120 Liberty St., New York.

E. E. Olcott, 36 Wall St., New York.

R. W. Pope, secretary American Institute of Electrical Engineers, 26 Cortlandt St., New York.

H. G. Prout, editor the *Railroad Gazette*, 32 Park Place, New York.

E. G. Spilsbury, 45 Broadway, New York.

Jesse M. Smith, St. Paul Building, New York.

Ambrose Swasey, Warner & Swasey, Cleveland.

Oliver Williams, Bryden Horse Shoe Co., Catasauqua, Pa.

C. Wallace Hunt, 45 Broadway, New York.

Calvin W. Rice, Nernst Lamp Co., New York.

Wm. Maver, Jr.

The following subcommittees were appointed: Medal committee—Chas. Warren Hunt, F. R. Hutton, R. W. Pope, and C. Kirchhoff. Finance committee—John Thomson, Ambrose Swasey, Jesse M. Smith, E. E. Olcott. Dinner committee—T. C. Martin, J. C. Kafer, H. G. Prout, E. G. Spilsbury. Invitations committee—S. W. Baldwin, N. H. Heft, R. W. Hunt, Oliver Williams.

Of the devotion of the various committees to their tasks and the success that crowned their work, the medal itself, the rules governing its award, and lastly the function at the Waldorf-Astoria on the evening of Oct. 31 give eloquent testimony. The execution of the memorial plans from beginning to end represents in itself a high type of engineering talent.

OBVERSE AND REVERSE SIDES OF THE JOHN FRITZ GOLD MEDAL.

Rules for the Award of the Medal.

The rules established for the award of the medal are as follows:

1. The John Fritz medal was established by the professional associates and friends of John Fritz, of Bethlehem, Pa., U. S. A., August 21, 1902, his eightieth birthday, to perpetuate the memory of his achievements in industrial progress.

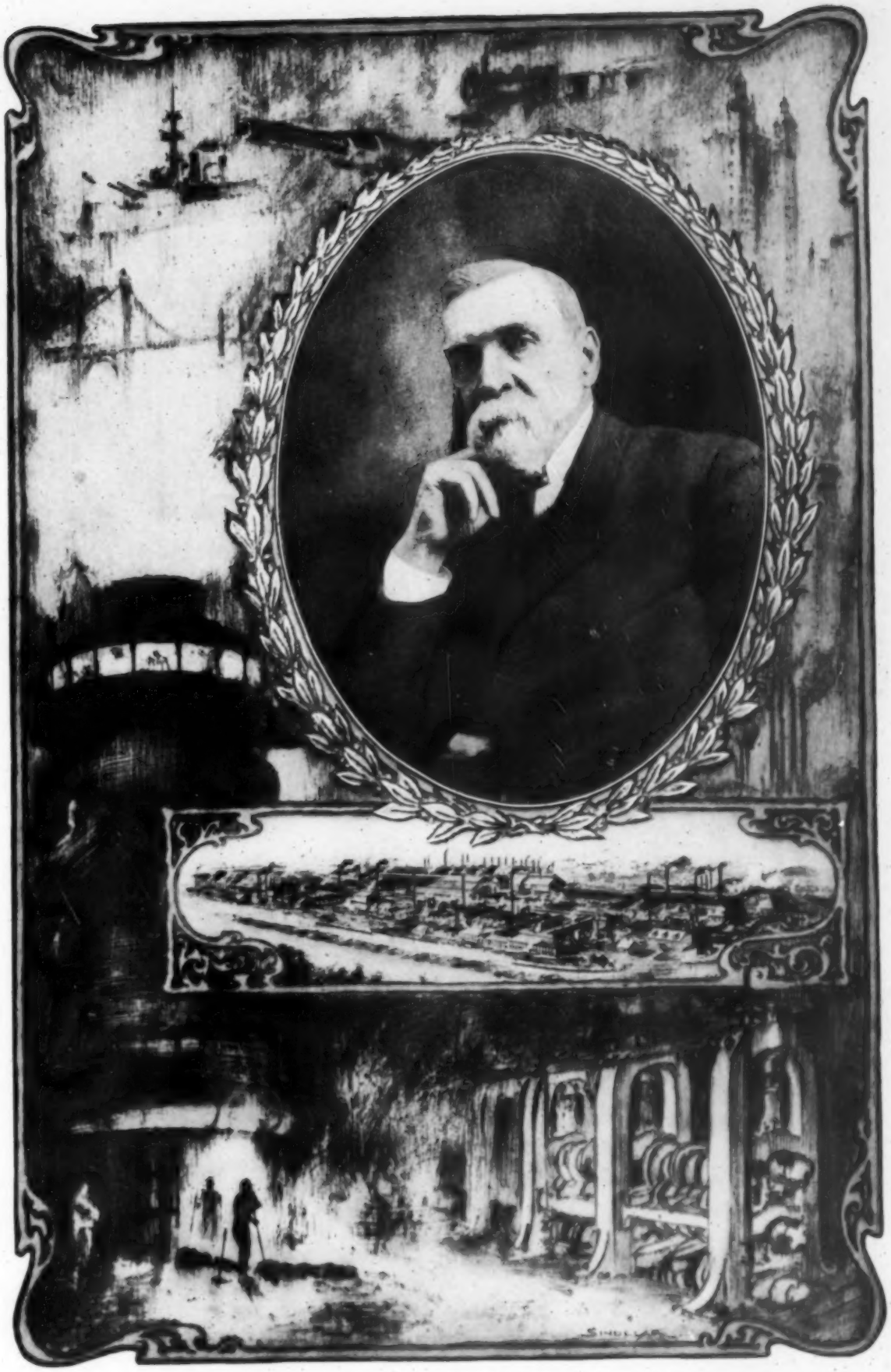
2. The medal shall be awarded for notable scientific or industrial achievement. There shall be no restriction on account of nationality or sex.

3. The medal shall be of gold and shall be accompanied by an engraved certificate, which shall recite the origin of the medal and the specific achievement for which the award is made. Such certificate shall be signed by the chairman and secretary of the Board of Award.

4. The medal may be awarded annually, but not oftener.

5. No award of the medal shall be made to any one whose eligibility to the distinction has not been under consideration by the Board of Award for at least one year.

6. Awards shall be made by a board of sixteen, appointed or chosen in equal numbers from the membership of the four national societies, the American Society of Civil Engineers, 1852; the American Institute of Mining Engineers, 1871; the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers. The governing bodies of each of these societies shall be requested to appoint from its membership one representative who shall hold office for one year, one for two years, one for three years, and one for four years; and each succeeding year to appoint one member to serve for four years.



J. Fritz.

Reproduction of the Frontispiece of the Dinner Souvenir.

Mr. Fritz signed these with his own hand.

AMERICAN SOCIETY OF CIVIL ENGINEERS FOUNDED 1852

Dinner to John Fritz

By Members of the
American Society of Civil Engineers
American Institute of Mining Engineers
American Society of Mechanical Engineers
American Institute of Electrical Engineers

To celebrate the founding of the

John Fritz Medal

Waldorf Astoria, October 31. 1902

Menu

Huîtres
Graves Supérieur

Potage Tortue Verte Claire
Amontillado Pasado

Radis Olives Céleri
Amandes salées

Suprème de Sole à la Tosca
Piersteiner Salade de Concombres

Ris de Veau à la Bayonnaise
St. Estèphe

Grenadine d'Agneau, Thermidor
Petits Pois nouveaux
à la française
Pommes de terre, Parisienne
Moët & Chandon, W. S.
Ch de Cazanove, Brut 1893

Sorbet à l'Orange

Pluviers rôtis
Salade de saison

Glaces de fantaisie

Petits fours Fruits
Fromage
Café

Reproduction of the Menu Card.

7. In case of failure of any of the national societies to make the original appointments as requested, the selection of representatives from its members shall be made by those appointed from the other societies, and should any future vacancy occur by reason of the failure of any of the said societies to act, or otherwise, such vacancy shall be filled by the Board of Award from the membership of the society so failing.

8. Should one or more of the four national societies go out of existence its representation on the board shall cease and determine, and future awards shall be made by the representatives of the remaining societies.

The Reception and Dinner.

Probably no social function in which the engineers of the country have taken the initiative has been so brilliant and so representative as the dinner given to Mr. Fritz in the ball room of the Waldorf-Astoria on Friday evening, Oct. 31—not excepting the banquet in 1890 when the members of the Iron and Steel Institute visited the United States. Subscriptions were received first from those who had contributed to the medal fund, and other friends were included, making the total number of guests something over 400. In the reception that preceded the dinner, Mr. Fritz, bearing well his four-score years, received the congratulations of as distinguished a company of engineers and steel manufacturers as has ever gathered in the United States. With him stood Mrs. Fritz, who later had a seat in the balcony of the ball room facing the speakers' table. The diners sat at round tables accommodating six or eight each, and the seating scheme was so perfectly arranged that the large company was taken care of without the slightest friction. In the lower tier of boxes overlooking the ball room were more than 100 ladies. Above Mr. Fritz's place midway of the speakers' table was an electric illumination with the legend, "1822—John Fritz—1902." The speakers' table had at one end a model of a modern blast furnace, about six feet in height, with complete equipment. At the other end were a Bessemer converter tipped down ready to pour and an open-hearth furnace with light blazing from the open door. As the last course was brought to the tables, enthusiasm was stirred by the bearing about the hall of various emblems of engineering achievement—models of a blowing engine, a bridge, a disappearing gun, a modern battleship, a latter-day flyer, all typical of triumphs to which many present had contributed an honorable share.

Those in Attendance.

Robert Allison, Joseph B. Adams, B. J. Arnold, Benjamin Atha, J. R. Andrews, E. A. Aeby, W. H. Adams, L. R. Alberger.

A. Bonzano, James C. Brooks, Seward Babbitt, S. W. Baldwin, Albert Brodhead, J. Sellers Bancroft, Charles F. Brooker, George M. Bond, L. F. Braine, Charles W. Buchholz, W. H. Bailey, James C. Bayles, James A. Burden, Nicholas F. Brady, William Bispham, W. I. Babcock, Joseph Barre, Capt. Miguel Bernard, Major Rogers Birnie, Thos. H. Barrett, Theodore Beran, Jas. Breslin, V. D. Brenner, P. A. Bates, F. A. Burr, A. P. Boller, Ed. Bailey, F. E. Bachman, C. E. Billings, J. A. Bensel, Archer Brown.

Robert Cartwright, George A. Crocker, Percival Christie, George W. Cope, E. S. Cramp, W. B. Cogswell, James Christie, Edward Cooper, Charles H. Cramp, Isaac H. Clothier, G. A. Chandler, A. M. Crane, E. L. Corthell, C. B. Crook, C. H. Cady.

Gano S. Dunn, T. M. Drowne, F. H. Daniels, H. C. Davis, E. Mc. Davis, Wm. H. Derbyshire, Theodore Dwight, S. L. F. Deyo, R. W. Davenport, T. M. Dodson, Charles M. Dodson, H. F. DePuy, Chas. B. Dudley, W. A. Doble.

Theodore N. Ely, C. M. Everest, James Entwistle, Summer A. Ely, D. L. Emanuel, W. S. Elliott.

A. I. Findley, Clark Fisher, B. F. Fackenthal, Jr., Robert Forsythe, E. L. Fuller, Graham Fraser, W. H. Fletcher, Lewis W. Francis, Andrew Fletcher, E. C. Felton, W. S. Franklin, F. Firmstone, F. W. Faber.

O. C. Gayley, Bernard R. Green, Walter Gaston, William Garrett, George Gibbs, James Gayley, Joseph L. Gobeille, Francis G. Gorham, Gen. Eugene Griffin, W. H. Guilledeau.

Robert W. Hunt, F. Benedict Herzog, H. M. Howe, John M. Hartman, A. C. Humphreys, Edward Hart, M. A. Halliday, F. R. Hutton, Charles W. Hunt, H. S. Haines, Charles R. Horn, F. V. Henshaw, George S. Humphrey, N. H. Heft, Henry D. Hibbard, F. A. Halsey, D. L. Hough, Philip W. Henry, Chas. W. Hunt, Wm. H. Haulick, C. R. Hanscom, Chas. W. Haswell, M. P. Higgins, L. W. Haskell, Edw. Harvey, John M. Hall, W. D. Hoxie.

E. H. Jones, W. H. Jaques, Archibald Johnston, D. S. Jacobus, J. E. Johnson, Robert E. Jennings, E. R. Johnes, D. P. Jones, J. F. Johnston.

Julian Kennedy, William Kent, C. Kirchhoff, Hugh Kennedy, John C. Kafer, Walter C. Kerr, Paul S. King, Alfred W. Kiddle, J. M. Knap, S. M. Keiper, William Houston Kenyon, W. P. Kirkpatrick, H. C. Knecht, J. F. Kernochan.

L. G. Laureau, E. D. Leavitt, G. Lindenthal, J. W. Lieb, Jr., Charles H. Loring, Horace W. Lash, L. F. Love, Garrett B. Linderman, Ray D. Lillibridge, Edwin Ludlow, Capt. P. E. LeFevre, H. D. Lewis, F. E. LeFevre, L. F. Loree, Jas. A. Lansing.

George S. Morison, Henry G. Morse, T. H. Millson, George W. Melville, John Markle, E. D. Meier, W. B. Myers, T. C. Martin Charles H. Morgan, T. R. Morgan, ames K. Mosser, William H. Morris, Charles A. Moore, H. H. Mitchell, H. F. Martin, Charles A. Matcham, George Mesta, J. J. McKee, E. M. McIlvaine, George W. McMurtry, George D. McCreary, R. C. McKinney, J. King McLanahan, Nevin McConnell, Arthur McMullan, George W. McNulty, McElmell, Father McEnroe, H. S. Manning, DeCourcy May, John F. Meigs, E. T. Mostert, E. H. Mullin, Edwin S. Mills, Josiah Munroe, Geo. W. Maynard, S. C. Munoz, Edw. Menner, J. R. Mills, Jr.

O. F. Nichols, A. Noble, Lewis Nixon, Edward P. North, Elmer H. Neff.

J. F. O'Rourke, George Ormrod, C. A. Otis.

H. F. J. Porter, H. G. Prout, Charles Pettigrew, George Q. Palmer, H. A. Prosser, H. de B. Parsons, Leonard Peckitt, Charles F. Porter, N. F. Palmer, Walter H. Page, F. F. Palmer, John Platt, W. S. Pilling, W. H. Pleasants, C. W. Price, G. H. Pegram, I. P. Pardee.

Rev. H. T. Quigg.

Charles Raht, William A. Rogers, Samuel Rea, Calvin W. Rice, David Reeves Charles F. Rand, William Rowland, Jacob Riegel, A. L. Rogers, R. W. Raymond, Henry B. Reed, Frank Richards, D. M. Riordan, Capt. Ruggles, J. Ramsey, Jr., C. L. Rohrer, H. E. Russel.

Irving Stearns, A. S. Schropp, John E. Sweet, C. D. Simpson, J. Waldo Smith, Angus Sinclair, Jesse M. Smith, W. L. Saunders, C. C. Schneider, E. G. Spilsbury, J. M. Sherrard, G. W. Stroman, Frederick A. Scheffler, J. William Smith, W. W. Scranton, C. S. Sims, Sidney L. Smith, William Stubblebine, J. R. Stanton, H. H. Suplee, William Sellers, George H. Sampson, W. A. Stanton, H. J. Seaman, Joseph E. Schwab, Henry Steers, Oberlin Smith, W. W. Snow, Charles T. Schoen, H. T. Scott, Max. E. Schmidt, C. P. Street, Geo. F. Sever, H. S. Snyder, W. A. Stadleman, R. P. Stout, C. E. Stafford.

D. A. Tompkins, Henry R. Towne, W. J. Taylor, Knox Taylor, L. H. Taylor, John Johnson, Harry C. Trexler, John W. Townsend, Samuel Thomas, Edwin Thomas, Stevenson Taylor, H. G. H. Tarr, Elihu Thomson, F. DuP. Thompson, Edwin N. Trump, Wm. R. Tucker, F. G. Tallman.

E. A. Uehling, F. D. Underwood.

C. H. Wellman, Joseph Wharton, C. M. Wales, Walter Wood, W. R. Webster, David Williams, Frank S. Witherbee, S. T. Wellman, Oliver Williams, W. J. Wilgus, Maunsell White, George E. Weed, W. R. Warner, John S. Wentz, B. H. Warren, William H. Wiley, Charles Wiley, William O. Wiley, Warren A. Wilbur, R. E. Wilbur, John Brisbin Walker, Edward C. Wallace, William H. Wallace, H. T. Wallace, G. S. Webster, E. H. Wells, Arthur Warren, H. Winfield Wyman, H. H. Westinghouse, Capt. G. A. White, F. W. Wood, E. P. Wilbur, Richard Wood, W. F. White, S. S. Wheeler, H. L. Waterman.

W. G. Zick, C. H. Zehnder, C. H. Ziegenfuss, E. L. Zalinski, W. B. Zehnder.

The souvenir containing the order o exercises, the menu and an inscription indicating the part taken in the memorial by the four national engineering societies, was a splendid specimen of the art preservative. It was printed on parchment paper and bound in heavy silvered stock, the outside front cover having embossed upon it a representation of an old-time blast furnace. The binding was with steel rivets and a small medallion in imitation of the medal itself. The back of the cover had a facsimile in gold bronze of the obverse and reverse sides of the medal. Two of the inside pages are reproduced in the engravings on pages 57 and 58. An inserted leaf gave on one side the list of toasts and speakers and on the other a poem by Dr. R. W. Raymond, reproduced below. A unique feature of the dinner was the serving of sorbet in wooden holders, made in imitation of T rail sections.

The Toasts and Responses.

When the time for speech-making came, Col. Henry G. Prout, who presided, told of the inception of the John Fritz medal. A few friends proposed to celebrate Mr. Fritz's 80th birthday. Then they thought to establish a memorial of his life and work. They decided on a medal to be given each year in recognition of eminent work in research or applied science. They made the individual subscription small that many might share it. "They wished that the medal might be like the olive wreath in the Olympian games, a little thing, provided at trifling cost, but a sign of glorious achievement, something that a man would put among the most precious trophies of his life. They provided for a permanent and dignified committee of award, to represent the four great engineering societies of this Nation. They provided that the medalists shall be chosen from all the world. They believe that, considering the field of effort which it covers and the manner in which it is awarded, the Fritz medal will be even a more dignified honor than the Bessemer medal, which Mr. Fritz is proud to hold."

The presentation of the medal to Mr. Fritz was made by

John Thomson, who unveiled a pair of bronzes cast from the master pattern of the clay modeler, and announced that it had been decided that the first John Fritz medal should be bestowed upon Mr. Fritz himself. At the same time Mr. Thomson presented to Mr. Fritz an album containing the autographs of all contributors to the medal fund. In the album was a photograph of Mr. Fritz, also of the obverse and reverse sides of the medal under which is inscribed: "To Perpetuate the name of John Fritz and his Achievements in Industrial Progress." The dedication is: "To John Fritz, Engineer, one of the Principal Founders of America's Iron and Steel Industry." In his speech of presentation Mr. Thomson said: "These plaster plaques were reproduced from the original clay models created by the artist, and from these were cast a duplicate set in bronze. But no other duplicates will ever be molded therefrom; for I shall now destroy the master patterns. I am duly authorized and directed by the founders of the John Fritz Medal to make the following official announcement of the award: We ask that you, John Fritz, accept these bronze plaques, the first John Fritz Medal, the only one of its kind which will ever be presented, as an award made by and coming directly from the founders, our unanimous finding being that, of all the captains of industry, this medal may most worthily be bestowed upon you. And we beg to assure you of our abiding belief that the crowning reward of your splendid achievements and character will be the perpetuation of your name, than which there can be no higher ideal for the engineering and industrial captains of the future. Now Mr. Fritz, for each and all of the founders I heartily wish you many long and happy years and growing honors and the love of friends."

As Mr. Thomson spoke of destroying the patterns he struck them with a mallet and threw them in pieces on the floor.

The reception given Mr. Fritz as he rose to respond was one that will long remain with those who participated in it. Rising as one man his friends gave him a tremendous salvo, with napkins fluttering in the air; and as, with characteristic modesty, in his words of recognition he disclaimed credit for all that had been attributed to him and protested that he did not deserve such honors, cries of "No," "No," came in a volley. As he finished Mr. Fritz was given three hearty cheers. He referred with feeling to his inability to speak in adequate terms. "Standing here my mind is carried back to the days of my youth, when working on the farm, from sunrise to sunset, bare-footed, as farm boys did at that time. Then my wildest imagination could not have foreseen this honor. I appreciate this greeting, and accept it as a token of your esteem and am truly sensible of the great honor you have conferred upon me, which gives rise to serene joy in my heart, and takes precedence of all other emotions. What have I done to earn this reception? What little I have done has been much overrated, and I am the recipient of honor beyond what I deserve, but I hope that my kind friends will continue to overlook my short-comings. I think of the laboring men who have stood by me and who will ever be held in high regard in my memory. I regret my insufficient education in the limited facilities of my native place, but I am glad that my worthy father inculcated in me economy and faithfulness and the religious training that taught me to revere a Supreme Being.

"There are times when it is agreeable to be under obligations to friends whom one esteems. I give you all my hearty good wishes." Referring to the establishment of the medal Mr. Fritz said: "I accept this in the name of the four great engineering societies and thank you from the bottom of my heart."

Abram S. Hewitt on Individualism.

It was expected that Abram S. Hewitt would be present to respond to the toast "The Fathers of the Art." Instead his response was read by Chairman T. C. Martin, of the dinner committee. Taking the life of John Fritz as his text Mr. Hewitt made some comments that have a bearing on current events and tendencies. They were received with strong demonstrations of approval. His letter follows:

"My Dear Sir:—As you are aware, I have been debarred for some time by the limitations of age from assisting at any function which takes place in the evening. I have been trying, however, to make an exception in favor of the complimentary dinner given by his admirers to my old and valued friend, John Fritz; but now that the time has arrived I find I must deny myself the pleasure of personally congratulating him, in the company of his loving friends, upon the attainment of his eightieth birthday in the full possession of his health and faculties, and with the promise of many honorable years to come.

"We have made the journey of life together and, to some extent, upon the same lines of action. It is pleasant to recall that during the half century of our association, at times of competitive struggle, the friendship which has existed between us has never in the slightest degree been disturbed. This happy experience is due, doubtless, to the amiable traits of Mr. Fritz's nature, which, with all its masculine energy, is tempered with the sweetness of the gentler sex. 'Once a friend, always a friend.' will be inscribed upon the record of a career which in some respects is unique among the men of our day and generation.

"I do not intend to indulge myself in recounting any of the interesting details of his long and useful life. This pleasant duty will be performed by others, but I do desire to point out that the life work of John Fritz affords a very conspicuous example of the working of American institutions during the century which has just closed, the most remarkable era of progress in the history of the human race.

"That a boy born in humble life, with no advantages of education or opportunities for position, without influential friends or the favoring accidents of fortune, should be able to advance steadily in usefulness, power and the respect of his fellow men, until by common consent he occupies the first place in the domain of practical industry with which he has been connected, gives conclusive evidence that political institutions which afford free play to individual ambition, industry, ability and strict integrity, are worthy of all loyalty and should be cherished and preserved at all costs and hazards.

"The developments of the twentieth century show that these institutions are in great peril. Their essence is to be found in individual liberty, involving the right of free labor and the acquisition of private property under lawful conditions. When the right of free action shall be suppressed the possibility of a career like that of John Fritz will be destroyed. Collectivism, ending in Socialism, may afford other advantages, but let it not be overlooked that these advantages will be obtained only by the sacrifice of personal freedom and will arrest the progress of civilization due during the ages that have passed to the substitution of freedom for force.

"John Fritz is a living proof of the results of individual and industrial liberty in a country endowed with boundless resources. In vain shall we seek for a like career in nations or in countries where the individual initiative has been suppressed. The stagnation of China, whose men are physically strong and whose resources are abundant, is a marked contrast with our own land, where heretofore every citizen has been free to employ his labor and his energies in his own way, so long as the rights of others were respected.

"John Fritz, therefore, is to us more than a man whom we love and respect, more than a friend to whom we wish many years of health and happiness; he is an example of the free spirit of American institutions, a beacon light warning the present and coming generations against permitting any invasion of the principle of the liberty of the citizen, which alone has made our beloved country great and free."

Following the reading of the letter Rear Admiral Geo. W. Melville was introduced to respond to "The Navy." His tribute to Mr. Fritz, whom he called the modern Vulcan, and lauded for his modesty, simplicity of life and his willingness to help young men, evoked hearty applause. In his introduction of the representatives of the army and navy, the toastmaster referred to Mr. Fritz's service in the manufacture of enginery of war. Though of gentle character he forged great guns for our army and was foremost in developing in the United States the type of armor plate that made possible the new American Navy.

Other responses were by Brig. Gen. Eugene Griffin, "The Army;" Dr. Rossiter W. Raymond, "The American Institute of Mining Engineers;" George Shattuck Morison, "The American Society of Civil Engineers;" Capt. Robert W. Hunt, "The American Society of Mechanical Engineers;" Prof. Elihu

Thomson, "The American Institute of Electrical Engineers;" Oliver Williams, "The Valley and the Neighbors;" Daniel A. Tompkins, "John Fritz's Old Boys."

Many cablegrams and telegrams of regret were read, one of the former being from C. Schrödter, secretary of the Verein Deutscher Eisenhüttenleute, of Düsseldorf, Germany. Another was from Ambrose Swasey, a member of the general committee, now traveling in Japan. Andrew Carnegie cabled: "Absence deeply regretted. Long life, happiness, health, wealth, and honor to John Fritz, rolling mill pioneer, friend and counsellor of us all." Charles M. Schwab sent this cablegram: "Though absent and far away, I wish to add my congratulations to Mr. Fritz on his eightieth birthday. He has done more for the steel industry than any man living and we all acknowledge him as our master and prize him as our friend."

A feature of the after-dinner program was the presentation of a loving cup to Mr. Fritz on behalf of Irving M. Scott, of the Union Iron Works, San Francisco. The inscription on the cup is as follows: "To John Fritz on his eightieth birthday. The builder of the West greets the Genius of the East. The Oregon's performance glorifies the steel of Fritz."

Mr. Fritz's Career.

It is to the great satisfaction of the engineers who have carried forward the work of John Fritz in making the American steel industry the greatest in the world, that he has been able in the recent years of his retirement from works management, to give permanent form to records of his earlier experiences. These are part of the transactions of the American Institutite of Mining Engineers, the Franklin Institute and the American Society of Mechanical Engineers, and many of our readers are familiar with them, particularly with Mr. Fritz's narrative of the building of the first three-high mill in America, that at the Cambria Iron Co.'s plant at Johnston, Pa. Born on Aug. 21, 1822, in Londonderry township, Chester Co., Pa., John Fritz left the farm at 16 to become a machinist's apprentice at Parkesburg. Later he removed to Norristown and thence to Safe Harbor where he erected the machinery of a rolling mill. Some blast furnace experience followed and in 1854 he went to Johnstown to rebuild the Cambria Iron Co.'s plant. In 1860 he built a puddle mill and rolling mill in the Lehigh Valley and later a blast furnace, this enterprise being the beginning of the Bethlehem plant at which Mr. Fritz gained his renown as a master steel maker, and as pioneer in the great forging and armor plate industry that made Bethlehem famous.

The poem "John Fritz" written by Dr. R. W. Raymond for the dinner of 1892, celebrating Mr. Fritz's 70th birthday, was reproduced in the souvenir of the Waldorf-Astoria dinner, and is as follows:

Whom shall we choose, the flag to hold
In our vast conquest, yet untold,
Which to the New World adds the Old?
Donner and Blitz!
John Fritz.

Leaders unseen are with us met;
Nor they nor we the past forget!
The fate that took them early, yet,
Thank God, omits
John Fritz.

Who stands before us, to combine
A level head, an upright spine,
With nowhere any crooked line?
Most clearly it's
John Fritz.

Whose heart is warmer than his blast?
Whose faith more steadfast to the last
Than any steel he ever cast?
That figure fits
John Fritz.

Whose fame commands our homage, such
As bears of envy not a touch,
Because we love the man so much?
..hy there he sits—
John Fritz.

On worthy breasts henceforward let
This token in his name be set—
A kingly name as ever yet
Signed royal writs—
John Fritz.

A bad slip at the blast furnace of the River Furnace & Dock Co., Cleveland, caused an explosion Nov. 3, which resulted in the cupola, hopper and bell being blown into the air. The stack was badly damaged and will be built according to plans determined upon some time since. It will be out of blast about 90 days. No one was injured by the accident.

LAKE SUPERIOR IRON MINES.

No. 4 ore dock of the Duluth & Iron Range road at Two Harbors, is out of commission for the remainder of this season. It was found a few days ago that the dock was coming down and all weight was at once taken off and repairs are under way. It seems that this dock, which was rebuilt and raised 10 feet last winter, was buckling in the lower series of timbers, just above the caps of the piling. The dock was originally 52 feet high, 1,112 feet long and had a capacity for 30,000 tons. In order to accommodate the newer and larger ships it was raised 10 feet and given a capacity for 36,960 tons. It will be in use as good as ever next season.

Fayal shipments will cease very soon. The mine has been producing 12,000 tons daily for some time past.

Several thousand tons of Hartford ore are being loaded out by steam shovel this fall. This is the first ore ever taken from the mine in quantity.

Interest of explorers on the Mesabi range seems to be centering in other locations than in the extreme West, and a number of drills will be put at work on the east end shortly. It is expected that much work will be done the coming winter east of the Biwabik mine, where there are several locations that have never been properly explored.

The old Lackawanna Iron Co. property, on the western Mesabi, belonging to the State, has been optioned for lease to Duluth parties, who will put drills in at once. They have an option at $100,000 and paid $5,000 cash for it. There has been some ore found on the lands.

Shipments of a small daily tonnage are being made from the Wills mine of the Thompson-Maitland syndicate. It is hoped to ship 10,000 tons this fall, and if the weather holds good this will be done. The Wills is a lease from Pettit & Robinson, of Minneapolis, and lies close to the village of McKinley, just south of the new abandoned Roberts mine. All the machinery of the latter is being moved to the neighborhood of Hibbing, where it will be used at the new Morrow mine of Jos. Sellwood and associates.

The Grant State lease belonging to Jones & Laughlins (the Interstate Iron Co.) has closed for the year. There was a contract to H. Roberts to mine 50,000 tons here, which he filled with 2,000 tons excess. He used the old exploring shaft. A double compartment shaft will be sunk this winter and the mine opened for considerable shipments another season. It is a very large deposit of much the same grade of ore as the Sharon, which it joins on the west. There may be and probably are 10,000,000 tons on the Grant. It was the possession of this mine that led to the abandonment of the Monongahela, on the Menominee range, by the same company a week or two ago. Grant ore can be mined far more cheaply than Monongahela, and is of much the same character.

A little ore is coming out of the new deep shaft at Savoy mine, Vermillion range, being sunk by the Oliver Iron Mining Co. It will be some little time before the shaft is ready for regular production. The immense shafthouse, 165 feet high and divided into many ore bins, is completed and ready for use and the duplicate at Sibley shaft is under erection. The two are to be run by a single machinery plant.

The choked drifts at Sharon mine, Mesabi range, that were filled up with sand and gravel in the early spring, will be reopened this winter and the mine made ready for a larger production. The ore body has been uncovered to a considerably greater area.

It is understood that Pickands, Mather & Co., who bought the Elizabeth mine, have been continuing explorations there and have found ore in several additional holes, and that the ore body is liable to show up a number of million tons more than the estimates on which it was bought from the exploring syndicate. This syndicate consisted of Duluth men, among whom was John P. Morrow, a son-in-law of Jos. Sellwood, and P. Kimberly, of Sharon, who came in after the property was found to be of value. In fact Mr. Kimberly's interest was bought at the rate of a valuation of $225,000 for the entire mine.

The Cleveland-Cliffs Co. has taken an option on the Barasa mine in Negaunee, Mich., with a view of purchasing the lease. This mine was closed down early in the spring. The same company has also secured the lease of the remaining holdings

of the Escanaba River & Land Iron Co., adjoining the Swanzy mines property. Some four months ago an option was taken and three diamond drills put in operation to test the value of the property and developments led to the purchase of the lease, the life of which is thirty years, with a royalty of 20 cents per ton, the minimum of 30,000 tons annually to be paid. The Barasa is a small mine with 20,000 tons of ore in sight. The fee is owned jointly by Baptiste Barasa and the Marchetti boys of Negaunee. Of late years the mine has been operated by the Barasa Iron Mining Co., officered as follows: President, John F. Mack, Marquette; secretary and treasurer, B. W. Wright, Ishpeming, and F. O. Clark and F. Bending, Marquette, together with the officers, directors.

The Steel Corporation and Price-Cutting.

E. H. Gary, chairman of the executive committee of the United States Steel Corporation, has made a statement bearing upon the recent cuts that some of the subsidiary companies of the steel corporation have made in their products. When asked if the company contemplated a reduction of output in any line, Judge Gary replied: "The policy of our corporation is to maintain reasonable and steady prices. We use our influence against an increase in prices and also against a decrease in prices, if those which obtain are fair and reasonable. If competitors in any locality and concerning any commodity cut prices in order to secure an advantage, our people immediately inquire carefully into all the facts. If there is justification for a decrease in prices, our people promptly meet the conditions, and all our customers are treated alike. We desire and seek the friendship of our competitors, but look first to the protection of our customers. We have on our books about 5,000,000 tons of unfilled orders and are booking weekly as much or more than we manufacture and ship."

Thos. Parrock, general superintendent of the mills of the Republic Iron & Steel Co., at Youngstown, has purchased the property formerly owned by the Eagle Furnace Co., in that city. The Eagle furnace was built in 1846 and was abandoned in 1885. The annual output was about 17,000 net tons of mill pig and Bessemer iron. Mr. Parrock is not now prepared to say what will be done with the property.

C. L. Hastings has been appointed Pittsburg representative of the Bethlehem Steel Co., of South Bethlehem, Pa. He has opened an office in the Keystone Bank Building.

CUTTING-OFF MACHINE FOR BOILER TUBES.

A double-end, double tool cutting off machine for boiler tubes is shown in the two illustrations. It is representative of several recently built by the Bignall & Keeler Mfg. Co., of Edwardsville, Ill., and the counterpart of the one shown by the halftones has lately been shipped to a new tube mill in the Pittsburg district. Fig. 1 is a general view of the machine and fig. 2 illustrates the details of the motor drive and of the carriage showing the two cutting off tools, reaming lever and steady rests.

The machine is designed to cut off boiler tubes from 2 inches up to 5 inches in diameter, and from 8 feet up to 20 feet in length. The bed is provided with two movable carriages, each carriage being equipped with a heavy steady rest, cutting off tools and reaming lever, the steady rests having interchangeable blocks, which are babbitted for the several different sizes of tubes. In this manner the tube is held firmly around the greater part of the circumference, and the plan provides nearly perfect tube rests.

The headstock is built with a lever chuck which is operated while the machine is in motion; in other words, after the grips in the chuck have been set for a certain size of tube the machine can be run continuously while working on that one size of tube, and as the machine is ordinarily run for a day or several days on the same size of work, the lever chuck accomplishes a great saving in time. A separate set of grips is used for each size of tube. The grips are made of tempered tool steel, and are turned to the exact outside diameter of the tube. The inside of the gripping surface is left smooth, and the tube is held by friction only, but as it is gripped nearly around the entire circumference there is no likelihood of slipping.

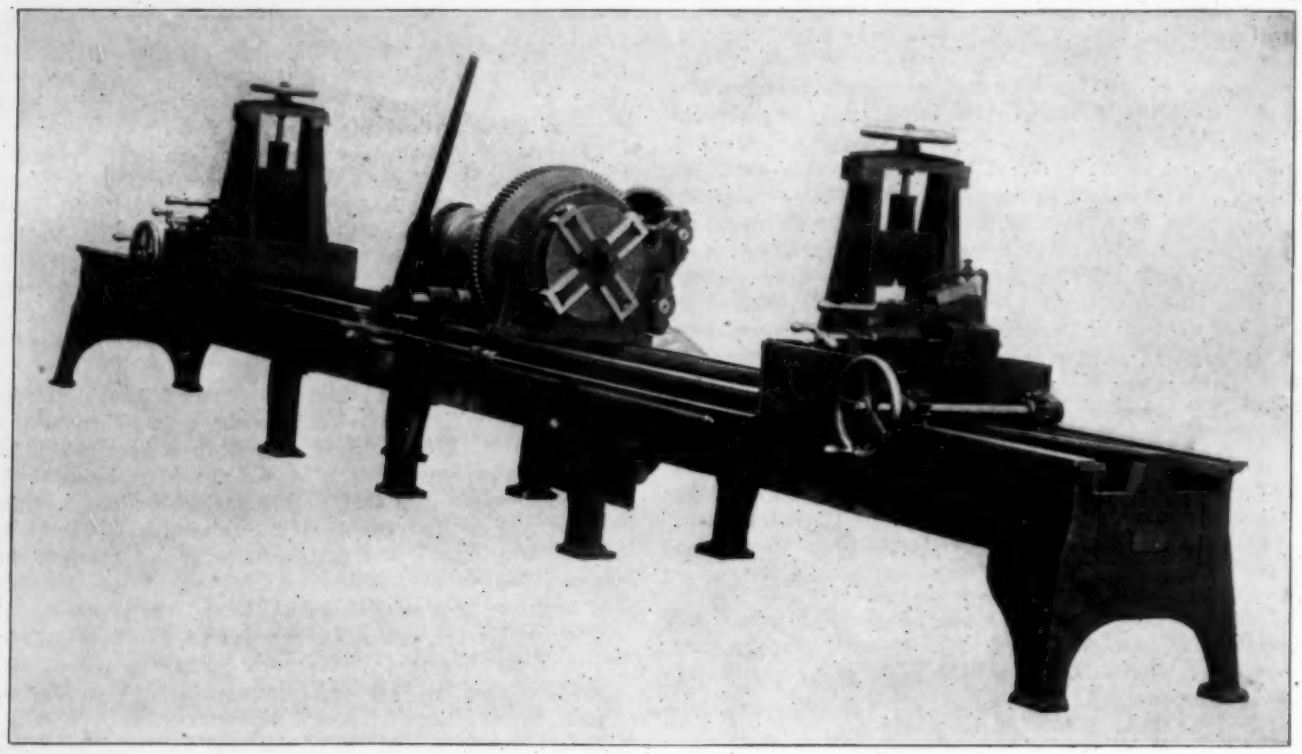


FIG. 1.—A NEW DOUBLE HEAD AND DOUBLE TOOL PIPE-CUTTING MACHINE.

The machine is equipped with a 3-h. p. Westinghouse induction motor supported on a swinging table which is hinged to the side of the bed. The motor is geared into a countershaft attached to the supporting table, and a short belt is run between the countershaft cone and the cone pulley on the machine. The weight of the motor and the countershaft resting on the swinging table table provides the necessary belt tension. The machine is provided with an automatic oiling system, which keeps the cutting off tools on both carriages continuously supplied with lubricant.

Foundry equipment will soon be placed in the manual training school at Ishpeming, Mich., and the students will make castings. J. C. Beswick, instructor.

The Machinery and Metal Working Trades—News Letters from Selling Centers.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., NOV 4.

The month of October in the machinery trade showed a slight falling off in trade. Some houses report that their business during the month was as good as that of September, which will be remembered as very active, but the majority of houses interviewed did not hesitate to say that business slackened up some with them. The weekly reports of salesmen show rather fewer orders than in the preceding month. The New England salesmen of one of the largest machine tool houses in the country, writing a monthly report to his house, said that he found business more restricted during the past few weeks than at any time in the year.

Everywhere the slight recession in trade has been received with expressions of approval, because it enabled the houses effected to catch up with orders that have practically been lying dormant for some time in consequence of the heavy business done during the present year.

The month has been conspicuous for the large number of small orders that made their appearance. With the majority of houses the month's business was exclusively confined to these. Though large orders were scarce specifications for several large lots were distributed during the month, the most notable being the equipment for the Snow Steam Pump Co.'s works at Buffalo, but the orders for this will not be given out probably for several weeks.

Railroads have been persistent buyers of machine tools during the month. The purchases, however, have been intermittent and mostly of small tools. The largest single purchase made was by the Chicago, Milwaukee & Western Railroad and consisted of small tools of various sizes, for installation at its shops at West Milwaukee, Wis. The order came through Western representatives of a prominent Eastern manufacturer and aggregated some $20,000.

The outlook for the machinery tool trade is regarded on all sides as bright. It is significant, however, that wherever this opinion is expressed it is supplemented with the remark that it is not going to be as easy to get orders in the future as it has been during the present year. Several prominent machine tool men expect competition to enter more largely into their trade in the near future, and say that many orders will come as a result of enterprise and hustle. "During the past year," said a member of a local machinery house, "orders have come to us without great effort on our part. I think the period of such orders is about over, and that we will have to bestir ourselves a little more to get business during the next few months. There is good business in sight, but it is a difficult matter to tell when it will materialize. We are now entering upon the two closing months of the year, and we will frequently hear, no doubt, of this or that order being held in abeyance until the first of the new year. I don't look for any notable business during the next seven or eight weeks, and those of us who manage to get our share of what will be going will perhaps not find the smooth road we have been traveling for several months."

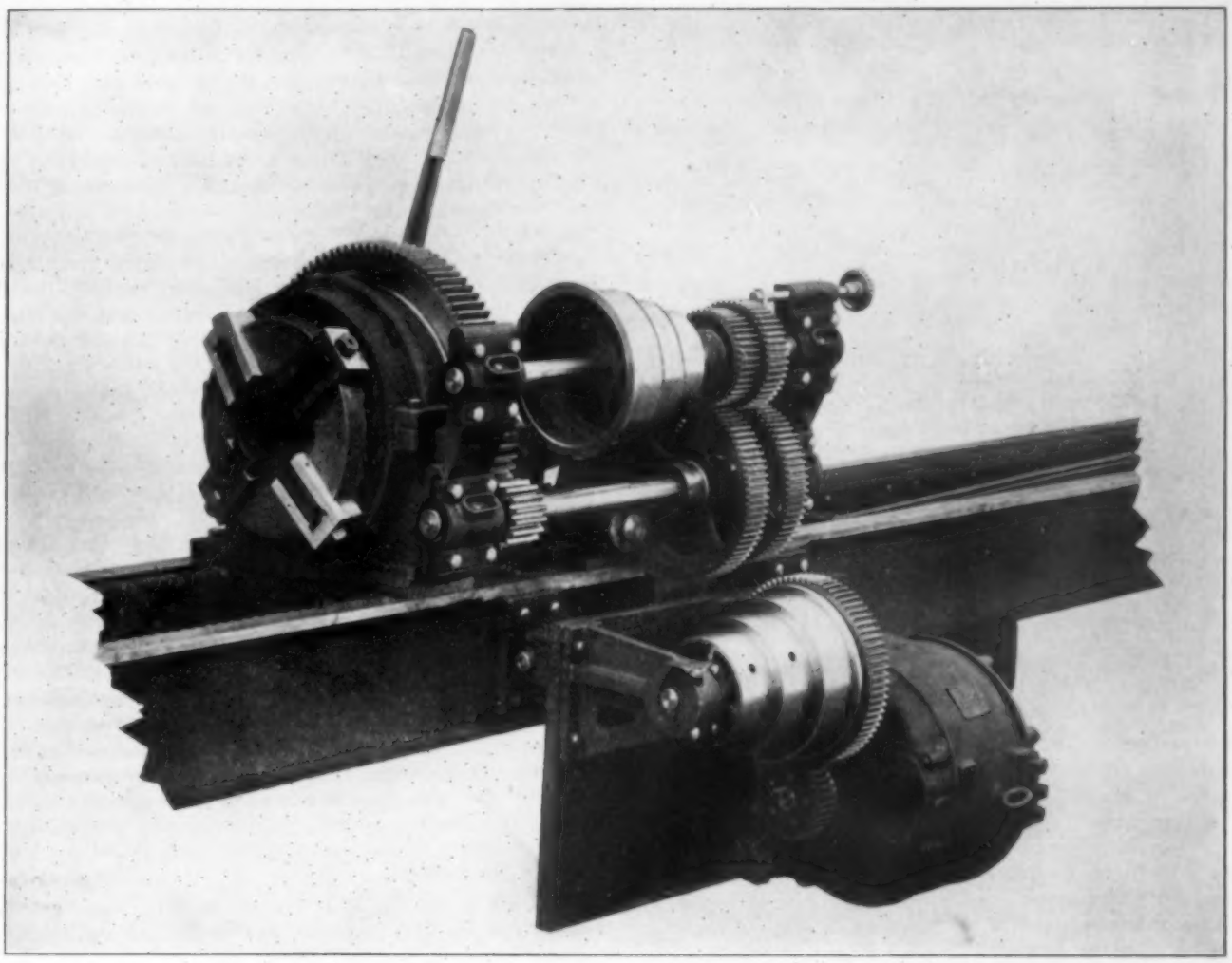


FIG. 2.—HEAD STOCK AND MOTOR DRIVE OF NEW PIPE-CUTTING MACHINE.

Manufacturers of electrical machinery report October to have been a very prosperous month, orders for power and lighting equipment being very large. Dealers in machinists', engineers', railroad, steamship, contractors' and mill supplies state that trade in their line during October was as good as any they have done this year. Many machinery houses say

that collections have shown a backward tendency recently, and they attribute it to the money stringency that visited Eastern financial centers during the past month. The treasurer of a large machine tool industry, says, however, that considering the serious form the latter took, he was surprised to find collections so good.

A feature of note during October was the improvement in deliveries. Complaints are still heard about the delays on large machines, particularly in lathes and milling machines. One large concern here, which always keeps a particularly large stock on hand, says its stock is now greater than at any time in the past eight months.

There are no fresh developments of note in the export trade. Business in this direction is along very limited lines, and probably will be while domestic manufacturers continue to receive profitable orders from domestic sources.

One prominent house reports a scarcity of steel balls, prices having advanced as high as 40 percent in some cases, with the average advance at least half that amount.

The Niles-Bement-Pond Co., of No. 136 Liberty, received some good orders during October, chief of these being from the General Electric Co. for machine tools to be installed at its plant in Schnectady, N. Y., and aggregating over $30,000. Another large order was for shapers for the Watertown Arsenal.

The General Electric Co., of 44 Broad St., received an order for a 5,000-k. w. steam turbine from the Edison Electric Co., this city, for its power station at 34th St. and East River.

A. D. Granger & Co., of 95 Liberty St., who make a specialty of equipping steam and electric plants, note an increasing number of inquiries in both directions, particularly in Southern and New England States.

The Crocker-Wheeler Co., of 39 Cortlandt St., has received the following orders: Complete motor equipments, from the Quintard Iron Works, New York City, and the Kleinert Rubber Co., College Point, L. I.; one 100-k. w. generator, from the Church-Nevin Press, Bloomfield, N. J.; complete lighting plant, from the Garfield Worsted Mills, Garfield, N. J.; and a generator for general lighting purposes, from the Seymour Mfg. Co., Seymour, Conn. This company have done an extremely profitable business in Mexico and Brazil recently. From Mexico it received an order from a prominent mining company, for motor driven machines of various sizes, which amounted to $20,000. Its total business for this year thus far, is at least 50 percent greater than for the corresponding period last year.

The Harrisburg Foundry & Machine Works whose New York offices are at 203 Broadway, W. P. Mackenzie, manager, have received many orders of late for engines to be installed in new office buildings in this city. The most notable are three engines, aggregating 650 horsepower, for the Battery Place Building; four engines, aggregating 525 horsepower, for the Wall Street Exchange Building; and three engines, aggregating 600 horsepower, for the new building at 42 Broadway. Other orders received by the company include one 200-h. p. engine, from the American Tobacco Works, at Danville, Pa.; three tandem compound Ideal engines, of 135-h. p. each, from the United Fruit Co., Costa Rica, and several small engines for use at the signal stations of the Government in the Phillippine Islands.

The Ames Iron Works whose local offices are at 143 Broadway, say that in consequence of their inability to deliver satisfactorily, they have been forced to turn down 30 orders for automatic engines during the past few weeks. They cannot fill an order for an automatic engine, even of the smallest size, in less than four or five months.

The Q. & C. Co., of 114 Liberty St., has received an order for 21 Bryant portable rail saws, for installation in the railroad shops of the Japanese Government at Yokohoma. Orders for pneumatic tools in small lots, but making large totals, have been a feature of their business recently.

The American Woodworking Machinery Co., at 136 Liberty St., reports that the improvements at its Aurora plant, will shortly be completed. The major portion of the necessary machinery has been purchased. The company's foreign trade has shown a notable improvement recently.

The American Gas Furnace Co., at 23 John St., has received through Charles Churchill & Co., Ltd.,, of London, an order from the British Government, for 18 large annealing and hardening machines, to be installed at the Woolwich Arsenal and the British Mint. Sometime ago the company made a large shipment of similar machines to the British Government also.

The Payne Engineering Co., of 141 Broadway, recently began making a specialty of engines adapted for electric lighting service in large office buildings and private dwellings, and reports an excellent business. The company has made recently, and is now making, improvements to its plant at Elmira, N. Y., to keep up with its increased business.

The George V. Cresson Co., at 141 Liberty St., manufacturer of power transmitting machinery, notes an increase in its orders in that direction recently, particularly from New England centers. At the works of the company in Philadelphia, there is now building a large amount of crushing machinery for mining purposes, to be installed in Western mining localities.

The Bullard Machine Tool Co., at 95 Liberty St., is in receipt of a large number of inquiries for heavy machine tools, and expects to close some good contracts in the near future.

The Sheriff, Swingley & Co., Ltd., of Liberty and Greenwich Sts., has received a letter from its special correspondent at Johannesburg, South Africa, stating that mining operations in that territory are being conducted on an increased scale, and that some good orders for machinery can be counted upon shortly. He speaks highly of the prestige enjoyed by American manufacturers of machinery in that country, and asserts that they easily have the call in prospective orders, although at no time have they faced such keen competition in this direction at the hands of English and German manufacturers as now.

M. H. Treadwell & Co., of 95 Liberty St., engineers, machinists, and founders, report that September showed a falling off in their line by comparison with recent months, but were pleased with the progress it enabled them to make on many orders that have not had due consideration because of pressure of business.

The C. & C. Co., at Washington and Liberty Sts., has received an order for two 125-h. p. engines, two 75-k. w. generators, and some motor dynamos, etc., for installation in the new hotel being erected on 31st St. near Fifth Ave., this city. Other orders given the company were for a 125-k. w. generator, for the shops of the Southern Indiana Railroad, at Bedford, Ind.; one 75-k. w. generator, switchboard, and motor, for the Lowell Fertilizer Works, at Lowell, Mass.; and three 30 and three 15-h. p. motors, for the Keasby & Mattison Co., Ambler, Pa. On the Edison circuit in this city, the company will place 25 motors, ranging from 1 to 50 horse power.

CINCINNATI.

Nov. 4.

Business in machinery, machine tools, boilers, and general power equipment continues active. Orders are coming in in steady volume and plants are all working with ample help and no hindrances. Jobbers find difficulty in having orders promptly filled, owing to the press of business. Where stocks of machines of various types are carried, the supply is light, indicating that generally the demand is taking the output of the machine builders as fast as they can be turned out. In boilers there are plenty of orders on the books, and one local plant is arranging for more room, finding present quarters inadequate. Machinery builders are also adding to their shops and acquiring more room. In this connection it is interesting to note the importance of Cincinnati as a machine tool manufacturing locality. In a recently issued census bulletin it is stated that Cincinnati manufacturers made during 1900 3,924 engine lathes, out of a total of 12,089 for the entire country, or almost exactly one-third of the whole number. Out of 3,076 slotters and shapers made in the United States, 1,019 or nearly one-third were made in Cincinnati. There were also made in this city 816 milling machines and 1,622 drilling and boring machines. There were thirty establishments devoted to the manufacture of metal-working machinery, almost exclusively of the classes designated as machine tools, and their aggregate product amounted to $3,375,436. Since the census year

many additions have been made to Cincinnati shops and capacity consequently increased.

As to business conditions it may be said that there has been practically no change. Prices are well maintained with little or no shrinkage in orders resulting from the July advance. The month of October has been one in which the outturn of the shops was particularly large. Foreign business shows no improvement. A few scattering orders are coming in, but the proportion of foreign business is not important.

The McIlvaine & Spiegel Boiler & Tank Co. has orders for boilers from Maley, Thompson & Moffett for the new large saw mill they are building in Cuba. The McIlvaine & Spiegel Co. is outgrowing its generous quarters and has acquired 300x80 feet of ground adjoining the plant at Pearl and Lawrence streets. The company has arranged to install a new 160-h. p. Skinner engine. All machines will be motor driven. The generator will be from the General Electric Co. Boilers are of the new Clyde type, internally fired.

The Cincinnati Planer Co. has purchased a lot 40x150 feet and has broken ground for an addition. The lot is directly across the street from the present location and extends from the east side of Buck St. to Spring Grove Ave. The building will be a one-story galvanized iron structure and will be used as a warehouse and storage room to relieve the crowded condition of the shops.

The Lane & Bodley Co. has purchased a 14-acre tract of land at Elmwood Place. Ground was broken this week for the erection of new works. The buildings are expected to be ready by June 1. Arrangements are under way for converting the property in the vicinity of the land recently purchased into a small settlement of workingmen's homes. The houses will be built and rented to the employes of the Lane & Bodley Co. and the Stacey Mfg. Co. The Stacey plant is at present under construction and will also be ready about June 1 next year.

John Steptoe & Co., expect to have their new plant, on Colerain Ave. near Happle St., in operation this week. They are making their move with as little interruption to business as possible. They believe that three days will cover the limit of time required for the move.

The Cincinnati Machine Tool Co. has just closed a nice month's business. The company has started the premium system in its shops recently and reports the plan to be working very satisfactorily, both for the machinists and for the company.

The coremakers' strike is still on here, but it is not causing any great inconvenience to the foundries. The foundrymen's association has held several meetings but is not giving out any statements as to what action it is proposed to take. Up to this time the employers have not shown any disposition to recognizes the strikers or their demands. A proposition is now being voted upon by the various locals of the Coremakers' Union and the Iron Molders' Union to consolidate the two organizations. If this consolidation is effected the molders, too, may be involved in the strike.

Extensive improvements have been authorized by the International Steam Pump Co. for its Laidlaw-Dunn-Gordon branch at Tweedvale, just outside the city on the C. H. & D. R. R.

The Lodge & Shipley Machine Tool Co. say they have had the largest shipping business during October of any month in the history of their business. They report a good, steady run of orders and outlook good for continued activity in their line.

The P. P. Silk Machine Tool Co. report a good, steady trade at full prices, and the shop busy with orders.

The Houston, Stanwood & Gamble Co. has built an addition to its factory 65x200 feet, which a little more than doubles the available floor space for building engines. The company will use this department for building all its engines 50 h. p. and under. The old shop being too much crowded, a portion of the smaller tools have been moved into this new department, and a 60-inch planer has been bought from the Cincinnati Planer Co., and a 30-inch lathe from the Lodge & Shipley Machine Tool Co. The company's trade so far this year is a little more than 50 percent in advance of that for the same period last year, and about 200 percent in advance of the average annual sales from '93 to '98 inclusive. Provision is being made, however, for holding this trade when times are not so brisk.

Mr. Edwards, who has been in the office as bookkeepeer and order clerk for ten years, has gone to New Orleans, making his headquarters with Woodward-Wight & Co., who are the company's agents. The St. Louis office under the management of H. M. Houston, who was trained in the works and office, has had a remarkably good trade this year. The company has been running its large tools an average of twelve days a week for about three years. Orders and inquiries are holding up very well, and the trade in large engines is growing very rapidly. The company has just shipped a 300-h. p. engine to the Carey Machinery & Supply Co., of Baltimore, Md., for Surry Lumber Co.; a pair of simple engines combined 250-h. p. to the Link-Belt Machinery Co., Chicago; and a 200-h. p. engine to R. S. Newbold & Son Co., Norristown, Pa.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Nov. 5.

October was generally a satisfactory month for dealers in machine tools and the outlook is that November will be still better. There have been no notably large sales, but a steady flow of moderate orders. The demand for machine tools and supplies from manufacturers of automobiles promises to be a feature of the winter. Cleveland is becoming one of the leading automobile cities of the country.

The B. & O. R. R. will soon have a new industrial track in the south part of the city. The track is to be constructed as a branch of the main line of the Valley road, at a point about two miles from the center of the city. It will extend in a northeasterly direction running along the east side of the canal, passing through a large tract of undeveloped land. The branch will be so constructed that it will also furnish excellent facilities for a number of manufacturing concerns which are located in that district and are now compelled to do a large amount of wagon hauling.

The foundation is being laid for the building to be erected on Case Ave near Payne by the American Can Co. It will be six stories, 82x164 feet.

The Marshall & Huschart Machinery Co. is now located in its new quarters, 24-26 Lake St. with space well adapted for the display of machine tools, of which a large stock is on hand.

The Brown Hoisting Machinery Co., the Cleveland Twist Drill Co., the Bishop & Babcock Co., and other companies on Hamilton and Lake Sts., have recently adopted a community of interest plan, so that in case of fire or accident to the power plant of any concern, power can be supplied by any of the others. With this idea in view, care has been taken in putting in new machinery, so that the plan can be quickly carried out at any time.

The Variety Iron Works Co. is making excellent progress in building the new furnaces at Toledo and Cleveland. It has been decided to erect the stack of the Cleveland Furnace Co.'s plant before the stoves are placed in position.

The Cleveland Punch & Shear Works Co. reports an excellent business in punches and drills. The company has recently installed a direct connected dynamo.

The building of the new machine shop of the Acme Machinery Co. has been finished, but it in not yet in operation, as a number of machine tools purchased some time ago have not arrived. The new office building will be occupied in a few days.

The Vulcanus Forging Co. has put in a ten spindle drill manufactured by the Cleveland Punch & Shear Works Co., one 25-kilowatt Northern Electric Co. dynamo, and fifteen Stanley arc lights. The Crawford Heating Co. is putting heaters in the plant. A new shipping room is being built, but work on the principal addition proposed has been delayed on account of inability to get steel and brick. This company was recently complimented by the Navy Department, which awarded it a contract for a carload of bolts for the navy yard at Norfolk, Va., in spite of the fact that there were lower bids.

The power house of the Bishop & Babcock Co. has been completed. The building is 70x40 feet, with a stack 110 feet high. The equipment will consist of a Ball tandem compound engine, a direct connected Westinghouse motor, two Babcock & Wilcox water tube boilers. The entire plant will be operated

by electricity with individual motors for different machines.

The Cleveland Machine & Mfg. Co., has installed a 2,500-pound hammer. The company is very busy making heavy machinery.

The Lucas Machine Tool Co., Glenville, will build an addition which will double the capacity of the plant.

The Ajax Mfg. Co., manufacturer of heavy forgings and upsetting machinery, shipped the Allis-Chalmers Co., West Allis, Wis., a 6-inch forging machine a few days ago. The machine weighed 110,000 pounds. A 55-ton forging machine was recently shipped the Pennsylvania R. R. Co.'s shops at Juniata, Pa.

The iron work on the new addition which is being erected by the Cleveland Twist Drill Co. is nearly completed.

Among the new contracts of the Garry Iron & Steel Co. are the following: Building for the Eberhard Mfg. Co., Cleveland; building for the Lake Erie Boiler Works Co., Cleveland; addition for the Lucas Machine Co., Glenville; building for the Brown-Cochran Co., Lorain; material for the heating plant of the Fremont Yargan Co., Fremont, O., and buildings for the Elyria Iron & Steel Co., Elyria, O.

The F. B. Stearns Co., will erect another addition for the manufacture of automobiles.

The Hoffman Automobile Mfg. Co. expects to put in a lot of new machinery.

George H. Bowler & Co., dealers in second-hand machinery, have a large stock on hand and expect to open another warehouse.

The McMyler Mfg. Co. is moving some of its hoisting and conveying machinery to the new plant at Warren, O. The local plant is for sale.

The new plant of the Winton Motor Carriage Co. is now occupied. The machine and erecting shop is 100x300 feet. A large amount of equipment has been installed.

The White Sewing Machine Co. will soon begin the manufacture of automobiles suitable for delivery of light parcels.

The Osborn-Morgan Co. proposes to erect a building for the manufacture of automobiles.

CHICAGO AND THE WEST.

OFFICE OF *The Iron Trade Review*,
934 MONADNOCK BLOCK, Nov. 4.

Production in most branches of the machinery trade continues to be limited only by the capacity of the shops of manufacturers. Every engine or machine tool completed goes into immediate service, and there are few concerns engaged in the manufacture of machinery for the metal trades that are not weeks, and more often months, behind in filling their orders. Orders for machinery wanted in the spring have to be placed now to insure their delivery. Some concerns are even refusing to guarantee any shipment whatever, the condition of the present supply of crude materials giving them no assurance on which they can make promises to their customers. This is the one disquieting feature in the trade situation of the West; and while its effect has not been felt to any great extent as yet, it is seen in the hesitancy with which manufacturers bid on new business, not feeling certain should they secure the order that they can make the delivery guaranteed. The tremendous impetus given the machinery trade in the past year, bringing with it the establishment of many new plants and extensions to existing shops, has created a dearth of competent workmen and with the limitations imposed by trades unions, the output suffers from this cause also.

Manufacturers of engines and boilers, power transmission and electrical equipment, machine tools, and all products of a machine shop or foundry, are laboring under a pressure of orders. The tendency seems to be to get into larger and heavier units, and there is a greater call for heavy equipment than for the more moderate sized tools. American manufacturers are also bending their energies toward capturing the export trade, and increased shipments are being made to foreign fields every month, the fact being recognized that home demand cannot always be at the present pace. The Hill Tool Co., Anderson, Ind., reports a great deal of foreign business in the past month. The Marinette Iron Works, Marinette, Wis., have made several export shipments of Walrath gas engines and mining machinery, and have several orders on their books waiting to be filled. The Model Gas Engine Co., Auburn, Ind., has recently established an agency in Paris, France. The Anderson Tool Co., Anderson, Ind., has made several shipments of universal grinders to France. The Chicago Pneumatic Tool Co. reports shipments of 500 machines a month on an average to European countries. This concern will commence work in the near future on a new plant to be built in England for the manufacture of pneumatic tools, and air appliances to supply its foreign demand.

None look for any marked diminution in the volume of trade, though here and there the pressure is not quite so strong; but if the condition of mills and furnaces improves in the near future and manufacturers can feel assured of a continuous supply of pig iron, coke and finished iron and steel, there is every reason to hope that the present industrial activity of the country will continue indefinitely.

George Whiting Co., 428 North Halsted street, Chicago, manufacturer of punches and shears, etc., has placed on the market, in addition to a high speed, quick acting punch, an improved belt power riveter for driving cold rivets, which was described in a recent issue of *The Iron Trade Review*. The company reports a large number of inquiries both for the punch and riveter, and anticipates an active trade in the coming year. Since it started in business several months ago, increases to the capacity of several departments of its works have been found necessary, and it is again laboring under a pressure of orders for the various tools which it manufactures.

Stover Manufacturing Co., Freeport, Ill., manufacturer of wind mills, tumbling barrels, etc., reports a falling off during the month in its wind mill trade due to the wet weather of the past few weeks. Business in the hardware department has been exceedingly active, and continues above normal, indications pointing to as heavy a trade in the coming year. The company has suffered from the coke shortage, though its supplies of pig iron and finished steel were ample for its needs.

Bignall & Keeler Mfg. Co., Edwardsville, Ill., manufacturer of pipe threading and cutting machines, sees no indication of any increase or decrease in the volume of business. The orders of last month were considerably larger than for the month of October in the preceding year, which has been true of the business for every month of this year. Notwithstanding the fact that the company has operated its shops continuously throughout the year, including much overtime work, it has been unable to keep pace with the demand for its tools, and has decided to increase its capacity. Preliminary plans for an extension to its plant have been made, though nothing definite has been decided upon as yet.

Murray Iron Works Co., Burlington, Iowa, informs us that it has numerous inquiries for Corliss engines, and that its shops are full of work. There is no indication of any falling off in trade, so far as its experience goes, and were it possible to make earlier deliveries, it believes a larger business undoubtedly could be booked.

Joseph T. Ryerson & Son, Chicago, sellers of punching and shearing machinery, are having a heavy demand from all parts of the country for heavy equipment. They report that they have received during the past month orders for heavier tools than have been built heretofore, and that the inquiries for the largest sizes of hydraulic and pulley driven machinery are in excess of any corresponding period. In small and moderate sized tools, the demand is increasing regularly. They attribute much of this new business to the larger sized plants that are being built, requiring heavier tools in their equipment.

Vandegrift Coupling Co., Evansville, Ind., manufacturer of the Vandegrift patent compression shaft coupling, is a little behind in filling its orders, necessitated by the change in removing its plant from Indianapolis to the present location. It has now got its new shops in good running shape, and hopes soon to be able to fill promptly all requests for shaft coupling. The largest shipment the company has made in the last month, was a 5 and 7-16-inch coupling, though it has filled many smaller orders.

Hill Machine Co., Anderson, Ind., reports that repeated orders for its line of power pumping machinery are being received from all sections where it has made previous installations. The power deep well heads made by it being so well adapted for electric drive, are meeting with a good demand.

In many instances, the company furnishes the motors and direct-connects them to the machines, making an ideal outfit. The Hill pumps have large gear ratio making them convenient for motor-driven work. They are also shipping many to be driven by gas and gasoline engines and other power. The company has recently shipped pumps to the following points: Flemington, N. J.; Pocahontas, Ia.; Salem, O.; Whiteland, Ind.; Newcastle, Ind.; Columbus, O.; Muldon, Miss.; Muncie, Ind.; San Antonio, Tex.; San Francisco, Cal.; Pittsburg, Pa.; Mineral Wells, Tex.; Anderson, Ind.; Los Angeles, Cal.; Chicago, Ill.; Alexandria, La.; Providence, R. I.; Iona, Minn., and other places. It has orders on its books not yet filled for pumps for the following cities: Milwaukee, Wis.; Newcastle, Ind.; Napa Junction, Cal.; Compton, Ill.; Columbus, O.; Dillon, Mont.; Anderson, Ind.; Manitowoc, Wis.; Newaygo, Mich., etc.

Ransom Mfg. Co., Oshkosh, Wis., manufacturer of Vulcan grinding and polishing machinery, reports an active demand for motor driven grinders. The company looks for a continuation of good business for some time in the future.

Williams, White & Co., Moline, Ill., inform us that the volume of business is so great that it is unable to complete machines fast enough to suit the wishes of its customers, notwithstanding that a large addition to its machine shop was recently completed. Among the shipments recently made was a large double punch for the Puget Sound Navy Yard. The company has brought out a new 275-pound Justice Hammer, which is a carefully designed, powerful machine of its kind. It finds trade good in all lines, particularly for punches and shears, drop hammers, bulldozers, power hammers, eye benders, etc.

Anderson Tool Co., Anderson, Ind., manufacturers of universal grinders, reports that orders are very plentiful. It is building a number of large grinding machines for shipment to Paris, also for shipment to Southern States.

Reeves Pulley Co., Columbus, Ind., will increase its plant in the spring by the erection of a modern foundry, and this fall it is building a large dry kiln of brick construction. Several days ago it shipped a pulley 20 feet in diameter, 30 inch face, and another 18 feet in diameter, the latter on an order from its Boston agents, Messrs. Jas. H. Roberts & Co. It reports that it has had a splendid business in the last month on both pulleys and clutches, and "The Reeves" variable speed transmission.

Vilter Mfg. Co., Milwaukee, Wis., reports that orders for ice making and refrigerating machinery, as well as for Corliss engines, are plentiful, and that it has all the business it can handle. It is contemplating erecting an addition to its foundry in order to more fully meet with the demand for its machines.

Stehn Mfg. Co., Sheboygan, Wis., manufacturers of air compressors and sand blast apparatus, reports that it is well supplied with orders for machinery of both kinds and that it anticipates a continuance of present conditions for some time. As its business increases, it will install new machinery and otherwise increase the capacity of its plant.

Lennox Machine Co., Marshalltown, Ia., manufacturers of gasoline engines, rotary beveling shears, tapping machines, etc., has had a larger business this year than ever before and is much behind on orders. It recently shipped a large splitting shear to the Great Northern Railway Co.'s shops at St. Cloud, Minn., one to the Wilson Steam Boiler Co., Omaha, Neb., and another to Mitchelman Boiler Co. at Quincy, Ill. It has lately placed on the market a rotary splitting shear for light plates, cutting from ⅛-inch material up to ½-inch with a 12-inch to 42-inch throat.

National Machine Co., 660 Washington St., Milwaukee, Wis., manufacturer of speed lathes, will be in the market for a milling machine next spring. It reports that it has just finished an order for ten speed lathes and has another order for ten more machines of the same kind on its books, with numerous inquiries and prospective orders in sight. Its shops have been operated day and night in the effort to make the deliveries promised, but the necessity of a larger plant is daily becoming more apparent and the company has decided to increase its capacity next spring.

Hill Tool Co., Anderson, Ind., manufacturers of tool holders, reports the largest business last month in the history of the company. Many orders have been received from foreign countries, and the Pacific coast trade has shown a marked improvement. It reports the outlook is very gratifying.

PHILADELPHIA.

Nov. 4.

The volume of business in this market for the month of October was not so large as that for the preceding month. It can hardly be said that there has been a lull but in some lines the business for the first half of the month was not up to the average of the business for the past six months. During the second half of the month there was a better tone to the market, but the recovery was not sufficient to bring the business up to the standard of the times.

Very few transactions of magnitude have been in evidence, sales mostly being small and for single pieces. In machine tool circles dealers report a light business, but plenty of inquiries. They are not at all worried over the decreased volume noticed and say it is anything but remarkable.

There is no doubt that the coal strike and the uncertainty in the supply of raw materials have tended to keep buyers out of the market. Again, many buyers are expecting declines in the prices of materials and prefer to wait for developments in this direction. However, the number of inquiries coming in convey a very strong impression that machinery of all kinds is in as great demand as ever, consequently nobody is looking for any immediate material change in the conditions which have prevailed for so many months.

Considerable complaint is heard as to the impossibility of obtaining steel castings. The steel foundries are taking two and three months on very ordinary castings, and this fact is leading to many changes in specifications, particularly as regards machine tools. Iron castings are being substituted wherever it is possible to do so.

Foreign business has picked up a little. There are more orders coming in, and inquiries are more numerous. Hench & Dromgold, of York, Pa., have received orders for quite a lot of agricultural machinery, and the York Mfg. Co. for refrigerating plants, for shipments to South Africa. There have also been some good sized shipments to Eastern Canada.

At the Baldwin Locomotive Works the greatest activity prevails. Operations on the new buildings are being pushed and every effort made to increase the facilities for turning out locomotives. Orders on account of the large specifications mentioned in last month's report have been given out, and the business was pretty well distributed. The Newton Machine Tool Works secured the orders for a large part of the special machinery, and Edwin Harrington & Sons Co. are to supply a good many tools of a standard character. The orders booked by the Baldwins during the month were very numerous, and included an order from the Pennsylvania Railroad for over 100 locomotives, which are required in addition to the 250 ordered in September.

Many of the local dealers and makers secured orders on the specifications issued for the equipment of the new shops at the League Island Navy Yard.

The Tabor Mfg. Co., maker of molding machines had the busiest month in point of shipments of any in its history. The company has just shipped 20 additional machines to the hardware manufacturing trade in one New England city, making 43 in use in that city altogether. All were of the type using ordinary gated patterns. The same company has also shipped the last power ramming element for the monster machine now being installed at the works of the Bethlehem Steel Co. and it is expected that the machine will be put in operation next month. During last week they received several orders for their new flask filling attachments, by which a flask is filled and struck off without waste of sand.

The Newton Machine Tool Works are very busy on orders for special and standard machine tools. A great deal of work is in hand including a large vertical milling machine for the American Locomotive Works, said to be the largest tool of its type ever built.

The Falkenau-Sinclair Machine Co. had a very good month, its orders including a 500-ton power press for parties in New York. It has several good sized power presses in course of construction which it is expected will be shipped this month, some of them running from 200 to 300 tons capacity. The company has shipped a large test specimen milling machine to the

West, which embodied special features. Business in standard presses has been very good all along and the demand for hydraulic presses and special engineering work has been quite large.

E. L. Martin, agent for the Union Steam Pump Co., of Battle Creek, Mich., reports a good month's business, among the orders taken being one for 16 large pumps for the new glycerine factory at Chester, Pa., and several small pumps for the same concern; another for a pump 8½x10x10 for the new filter plant at Torresdale, Pa.; and another from Krieble & Co., Philadelphia, for a deep well engine and boiler feed pump.

At the works of the Barr Pumping Engine Co. business is very active, particularly in the small pump department which is much behind with orders. Among the larger work in hand is a 12,000,000 gallon plant for the Trenton, N. J., water works.

Bingham & Co., manufacturers of oiling systems, engine guards, and exhaust heads, are very busy, some of the contracts in hand being very large. They have made some large shipments to Canada, and points West and South.

Quigley & Krastin, Woodberry, N. J., makers of automatic chucks, automatic collapsing taps, and self opening dies, secured some nice orders during the month, and state that they are meeting an excellent demand for their tools.

The Espen-Lucas Machine Works, builders of cold saws booked many orders for their tools and shipped a number of machines to various points.

Israel H. Johnson, Jr. & Co., lathe builders, report a satisfactory volume of business for the month. While their shipments did not include large tools, a good many small ones went out of their works.

Recent sales of Renold silent chain by the Link-Belt Engineering Co., Nicetown, Philadelphia, include the following: Nine line shaft drives from motors for the new works of the Patton Paint Co., Newark, N. J.; eight drives from motors to line shafts and elevators in the new model plant which the Crompton & Knowles Loom Works are erecting in Philadelphia; and eight 60-h. p. drives for induced-shaft blowers in the new Waterside station of the New York Edison Co. There are now sixty-one Renold silent chains in use in the new building of R. H. Macy & Co., varying in capacity from 1 to 90 h. p.

In connection with the establishment of its blast furnace and steel plant at Gadsden, Ala., the Alabama Steel & Wire Co. has purchased the Alabama City, Gadsden and Attalla Railway Co., also the Queen City Electric Light Co. and the Gadsden Ice Co. The railway company operates a line between Gadsden, Alabama City and Attalla. It traverses the location of the new steel plant. The steel company has also purchased the Gadsden Land & Improvement Co., including all its real estate, which consists of over 700 acres of land in and around Gadsden. A large portion of it is in the city limits and is plotted.

The International Steam Pump Co., New York, which has expended $125,000 during the past year for improvements to its plant at Tweedvale, near Cincinnati, will spend $150,000 additional in the extension of the machine shop and purchase of tools.

Jamsetje Tata, of Bombay, India, was in Cleveland this week seeking information concerning the iron and steel industry, as he intends to build a rolling mill in his home city. He was entertained by Senator Hanna and others while in Cleveland.

Announcement is made of the dissolution of the firm known as the Rogers & Hemphill Machine Co., Alfred, N. Y., the interest of J. C. Hemphill having been purchased by D. H. Rogers, who will continue the business under the firm name of Rogers Machine Tool Co.

The pattern makers working in the shops in Cincinnati have given notice to their employers that they will ask an increase in pay in the new wage scale that is to be submitted this week. Thursday, Nov. 6, is the time for the old scale to expire. The present rate of pay for pattern makers is between $2 and $3 a day. The rate which will be asked for is a minimum of 37½c an hour for a nine-hour day. Besides the increase in pay an apprentice ratio of one to seven will be demanded. The employers are said to regard the men's request unfavorably and there is some prospect of a strike.

STRIKE IN CLEVELAND LIGHT GRAY IRON FOUNDRIES.

As stated in last week's issue, the light gray iron molders in Cleveland made a demand upon the various foundries of that class for an increase of 15 percent in wages, several changes in shop conditions, recognition of the shop committee as a factor in establishing piece prices, etc. These demands having been refused by the various foundry operators individually, the officers of the Iron Molders' Union of North America requested the officials of the National Founders' Association to arrange for a conference on behalf of members of the association in Cleveland. In accordance with the terms of the New York agreement, this conference was granted, and the Cleveland light gray iron foundrymen met representatives of Iron Molders' Union, No. 27, Thursday, Oct. 30. After some discussion the officers of the I. M. U. withdrew their request for a 15 percent increase in wages, and centered their efforts upon obtaining the recognition of the shop committee etc. The conference adjourned without having adopted any measures for settlement and as a result six foundries in Cleveland were confronted with a strike on Monday morning, Nov. 3. The following shops are affected: Acme Foundry Co., Fanner Mfg. Co., Hoffman Hinge & Foundry Co., Ohio Foundry Co., Standard Foundry Co., and Walworth Run Foundry Co. A total of 613 molders are on strike.

The matter has been referred to the National Founders' Association, and no action whatever has been taken by the local foundrymen, who are thoroughly united and who take a determined stand against the recognition of the shop committee as a factor in price-making, owing to the very disastrous experience of one of the local foundries which operated a union shop on light work a few years ago.

New Vessels of the Steel Corporation.

The publication of the alleged shipbuilding program of the United States Steel Corporation has caused much discussion. Statements made during the week by those directly interested show that the publication of last week was substantially correct, but we are able to add now that the new vessels will be 550 feet keel and will have a capacity of 9,000 tons. No barges will be used. The time for beginning work on the vessels and their number are not determined, but General Manager Wolvin, of the Pittsburg Steamship Co., has been quoted as saying that the company is planning to build new boats and has obtained options on berths which may be available at the yards of the American Shipbuilding Co. next year. It is safe to predict that none of the new vessels will be in commission before 1904.

John M. Hansen, J. B. Brady, A. B. Frazer, and others connected with the Standard Steel Car Co., of Pittsburg, Pa., have purchased the entire capital stock of the Southern Car & Foundry Co., whose plants are located at Memphis, Tenn., Lenoir, Badsden and Anniston, Ala. In addition to the plants at these points, a property was acquired at Birmingham, Ala., on which it is the intention to erect a modern steel car plant. The properties purchased consist of four car-building plants with a capacity of 15,000 cars per year; a rolling mill with a capacity of 45,000 tons per year; one blast furnace with a capacity of 18,000 tons of charcoal iron per year; one malleable iron works with a capacity of 9,000 tons per year; three cast iron foundries with a capacity of 18,000 tons per year; two wheel foundries with a capacity of 200,000 car wheels per annum; one large machine shop capable of building all kinds of machinery, steam engines, etc.; sawmills with a capacity of 30,000,000 feet of lumber per year, and 3,000 acres of long-leaf yellow pine timber land, together with valuable options on other timber lands.

During the month of October the Pressed Steel Car Co., of Pittsburg, built and shipped 3,000 cars of the wood and steel type. The average for the 27 working days of the month was 111 cars per day. On one day 130 cars were turned out, which broke all previous records. Thus far this year the plant turned out 22,402 cars, requiring about 350,000 tons of steel in their erection. The new car truck plant at McKees Rocks is fast nearing completion. The building is 120x600 feet.

The New Plant of the Webster, Camp & Lane Co., at Akron, O.

The new South works of the Webster, Camp & Lane Co., at Akron, O., are being rapidly equipped with machinery and this is being put in operation as fast as capable machinists can be obtained to help out the overcrowded city plant. The shops are located on a site with ample provision for future extensions so far as can now be foreseen, but this may be as inadequate an allowance after all as was the estimate made in the case of the old plant with its 2¼ acres and 250 employes. The present plant, comprising the new and old works, will be continued, though the greater convenience of the modern buildings in the suburbs will gradually lead to the absorption of most of the work. This, however, will be a matter of growth and no sudden change, in view of the current pressure of business, is contemplated and such a course would seem to be highly impracticable.

The original enterprise was founded about half a century ago by the late Charles Webster and James B. Taplin, who bought out a stove founder. Mr. Webster was a native of Connecticut, and seeing the trade advantages of increasing mill construction in Ohio and the Middle West, undertook much millwright work and in this direction laid the foundation of the present engineering firm. An Eastern acquaintance of Mr. Webster became a member of the partnership on the withdrawal of Mr. Taplin, and the name of the firm was transformed to Webster & Camp. Later still Julius S. Lane, who had invented a clutch of special value in connection with mining machinery took an active interest in the business and the firm name assumed its present form. The senior members of the old company are now dead and Mr. Lane has ceased to have any active connection. The company was incorporated in 1869 with a capital of $100,000, increased in 1901 to $300,000, and is under the management of Messrs. John MacGregor, president and treasurer; H. B. Camp, vice president; S. H. Pitkin, secretary and general manager, and J. W. Chamberlain, superintendent. A complete list of the products of the company would be too extensive for publication here, but the output covers general mining machinery as well as complete equipment for the manufacture of stoneware and sewer pipe, and a varied line of Corliss and hoisting engines having a number of patented improvements. The engines are built in different forms—vertical and horizontal, condensing and non-condensing, compound or triple expansion from 30 h. p. up to 2,000 h. p. The company makes a specialty of complete equipment for mines, including hoisting and ore handling machinery, and undertakes the erection of plants, furnishing the engines, boilers, cages, pumps, etc., as well as all the necessary machinery required in the reduction of ores. In addition to this line a specialty is made of ore and coal handling machinery, the company being the sole manufacturer of the Hulett patent machines for this purpose, among which are the ponderous ore unloaders which take the iron ore from vessels direct, without the use of shovels or manual labor, in 10-ton buckets, discharging into the ore cars or onto stock piles on the dock. Similar machines are also adapted for use at blast furnaces for unloading ore from the ore cars, which are dumped automatically through the Hulett patent dumpers and the ore transferred to the furnaces or the stock piles by means of automatic conveying machine. A large amount of hydraulic water power machinery in general is made and one contract of 25,000 h. p. of water wheels has been completed for the power plant at Sault Ste. Marie, Mich., comprising an unequaled installation.

The thoroughgoing character of the company's product gives interest to an inquiry in regard to their future plans and the new shops are in answer as showing the present requirements and the attempt to meet them. The plant is located near to the railroad and a spur track, as indicated in the general view in Fig. 1 and in greater detail in Fig. 2, runs into the buildings and wherever car facilities are at all advisable. Perhaps it is the logical outcome of a long experience in hoisting and conveying material that the hoisting, crane and railroad facilities of the new plant are so ample and work so well together as a lifting and carrying combination. Crane service of the jib and traveling type covers the entire working area of the plant, and these conveniences count for much in the rapid handling of such heavy material as is frequently found in the daily product of a shop of this kind.

FIG. 1.—THE NEW PLANT OF THE WEBSTER, CAMP & LANE CO., AT AKRON, O.

The erecting shop seen to the extreme right of Fig. 1 is also illustrated in the interior view of Fig. 3. This building is 110x440 feet. The crane has a 60-foot span and 30-ton capacity with the main hook, the auxiliary lifting 5 tons, and is 40 feet from highest position of hook to floor. The height from base of the columns to the main truss is 42 feet and from base of columns to top of truss is 58 feet 8¼ inches. On the extreme right of Fig. 3 is to be seen a portion of the hydrostatic press. This tool has a capacity of 400 tons and will handle a 30-foot shaft.

Leading to the left from the erecting shop are four wings: No. 1 will contain the small tools and is a building 80x150 feet, equipped with a 15-ton crane having a 35-foot span. No. 2 is the forge shop 80x200 feet, and will have three jib cranes, one of 3-ton capacity and two of 5 tons each. The forge shop is equipped with Buffalo forges of the down draft type, the smoke and gases being carried off by a large exhaust fan. There are also two steam hammers here, together with a large heating furnace. Wing No. 3 contains the power plant and is illustrated in Fig. 4. This is also 80x150 feet. The planer department is largely represented here and the runway is equipped with a 15-ton, 40-foot span, crane. The main line shaft is driven by a 125-h. p. Akron Corliss engine, using steam at 125 pounds pressure from two 200-h. p. water tube boilers, built by the Erie City Iron Works. The boilers are equipped with the Murphy furnace pattern stoker, and it is the intention later to equip the boiler plant with an overhead storage system from whence the coal may be fed by gravity to the

fires and the ashes and cinders discharged by power to the outside of the building. This development will make a model engine and boiler plant and may be kept scrupulously clean and neat. The isolated groups of machine tools and line shafts in the various wings are driven by a series of electric motors operated by a 220-volt current generated by a direct connected 200-k. w. General Electric Co.'s generator, to which is attached a 300-h. p. tandem compound automatic high-speed engine of the Webster, Camp & Lane manufacture. Space is available for a duplicate of this engine which will be installed later in order to increase the electric power as required. Fig. 5 illustrates wing No. 4, and this structure is 80x150 feet. This building will be used as a machine department and a portion of the space may be devoted to the pattern work. A 15-ton crane will be placed in this building, but at the time of taking the photographs was not in position. The office of the superintendent is at the right in Fig. 5, and in the gallery overhead are the lockers of the workmen and here will also be located for the present the dining room of the machine department.

Fig. 2 suggests the general outline of the manner in which the work is to be handled. Starting from the receipt of the raw material from the railroad, the further end of the foundry from the entering main line switch will be utilized for the making of light castings. A spur from the shop railroad system connects this department with the end of the machinery installation in wing No. 4 and the erecting shop, which is most likely to care for this work. The end of the foundry where heavy casting will be done is also similarly joined with the erecting room and the manufacturing departments. As the work is machined, assembled and tested, it passes down the erecting floor to the main line connection and is then loaded on railroad cars for final shipment.

The foundry is seen in Fig. 6 and is a structure 110x300 feet having a crane span of 60 feet. The traveling crane is of 30-ton capacity with a 5-ton auxiliary hoist, and is 35 feet under the hook. A 5-ton traveling crane commands the core ovens. The building is exceptionally well lighted, as is the remainder of the plant for that matter, by monitor and skylights, the heights from the latter to the ground being about 60 feet 5 inches. The height from base of columns to main truss is 37 feet 11¼ inches and from base of columns to top of main truss is 54 feet 7¾ inches. The roof skylights may be reached individually and adjusted or cleaned from a couple of railed footboards which run the entire length of the building. Underneath the runways supporting the traveling crane and attached to the columns are several 5-ton jib cranes, as seen in Figs. 2 and 6. These are attached to the uprights in such a manner that they can be readily removed and carried by the overhead traveling crane to other columns in the building and as easily placed in position. The foundry in the new plant is at present provided with one 60-inch Colliau cupola of 14 tons capacity and one 42-inch Whiting cupola of 6 tons capacity, or a combined capacity of 20 tons per hour, the blast for these cupolas being furnished by Root positive blowers driven by electric motors. All the power in the foundry will be electric with the exception of the compressed air used for air rammers and chippers. The sand is sifted by means of a portable sand sifter driven by electric motors mounted thereon and the cupola cinder is treated with one of Sly's cinder mills which separates the iron and the coke from the refuse; this also being

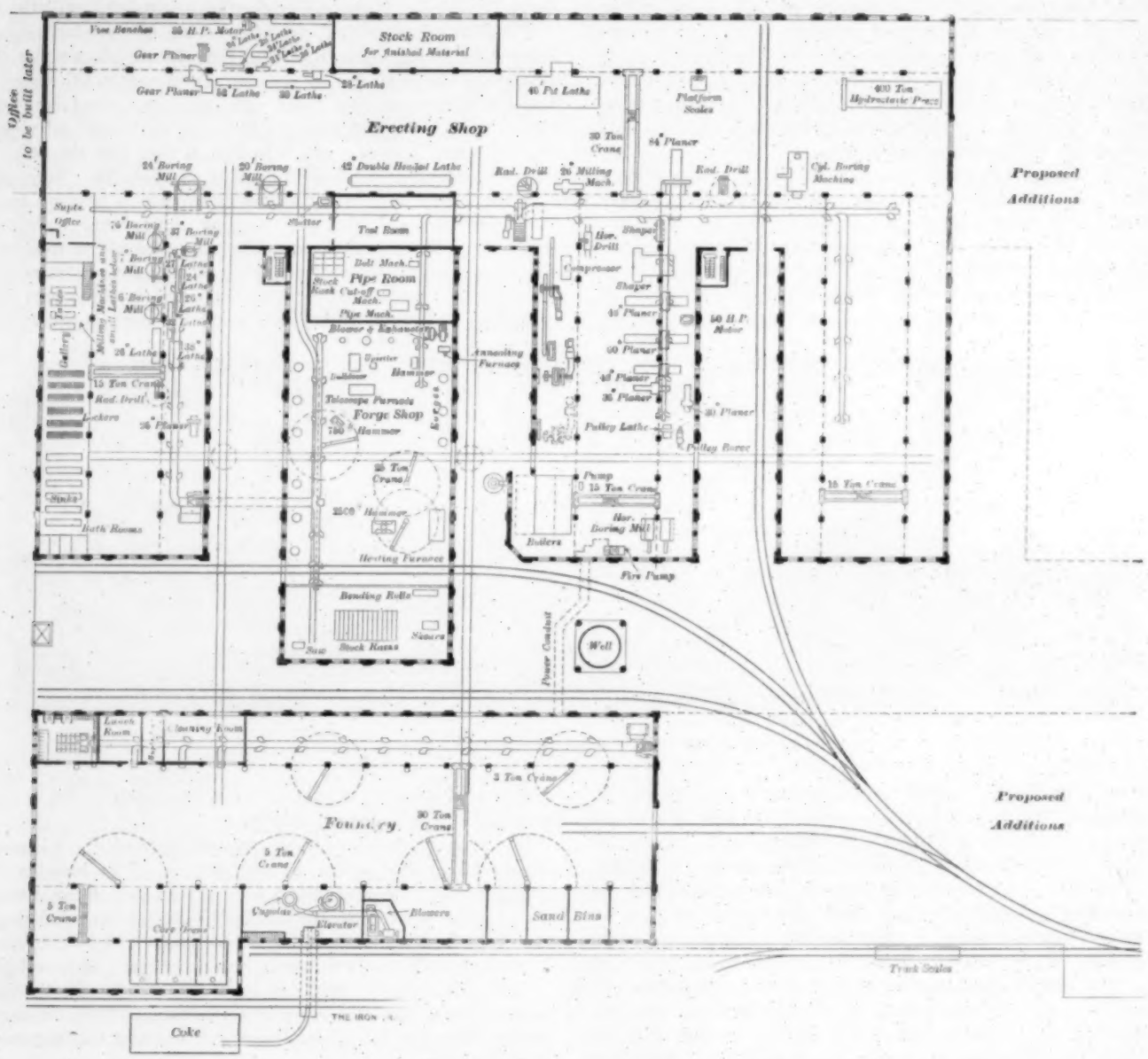


FIG. 2.—PLAN OF WEBSTER, CAMP & LANE CO.'S PLANT.

driven by an independent motor. The core ovens are so arranged that they are fired from the rear, using either natural gas or coke as desired without changing the grate. Additional drying ovens will be erected in the near future for handling loam work, of which this company does a very large amount.

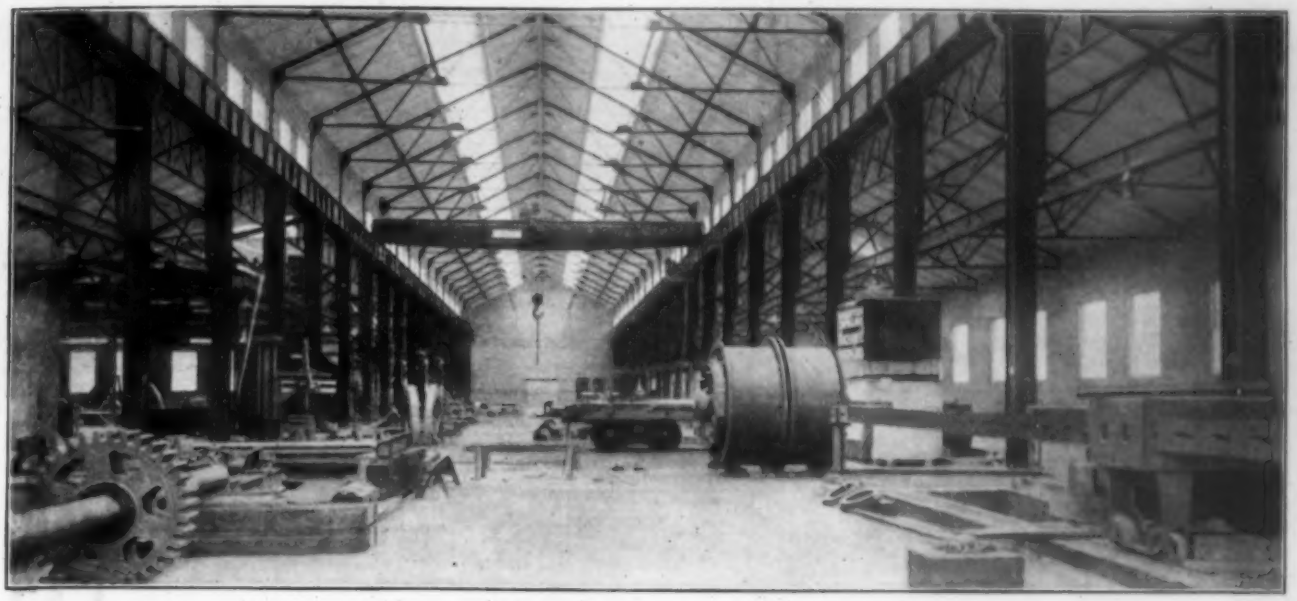


FIG 3.—ERECTING SHOP.

A lunch room is provided for the workmen in the foundry. The sanitary conveniences are of the improved type and every precaution taken to avoid any malodor by a thorough system of ventilation. Ample provision has been made for heating the entire plant. In the main machine shop there are located two large hot air blowers, one 144 inches diameter and one 90 inches diameter, furnished by the New York Blower Co., and driven by Webster, Camp & Lane engines.

In the foundry there is a separate heating system with a 108-inch blower. When the plant is in full operation 500 to 600 workmen are expected to be employed and from 150 to 200 of these will be at work in the foundry.

The industrial railroad through the works is built to standard guage and at a later date the company will probably purchase a steam or other type of locomotive for shop and yard use.

A warehouse is under construction and the next building will be an office structure which may be erected at any time. The site is of sufficient area to permit of considerable expansion of the works in addition to these improvements in the near future.

The buildings are of thorough fireproof construction and substantial in every particular; of steel, concrete and shale brick, not a pound of cut stone being employed about the plant.

The Ground Hog Plow & Foundry Co., Clarksville, Tenn., has bought the plant and business of Drane & Co., of that city. The plant will be enlarged and chilled plows will be manufactured.

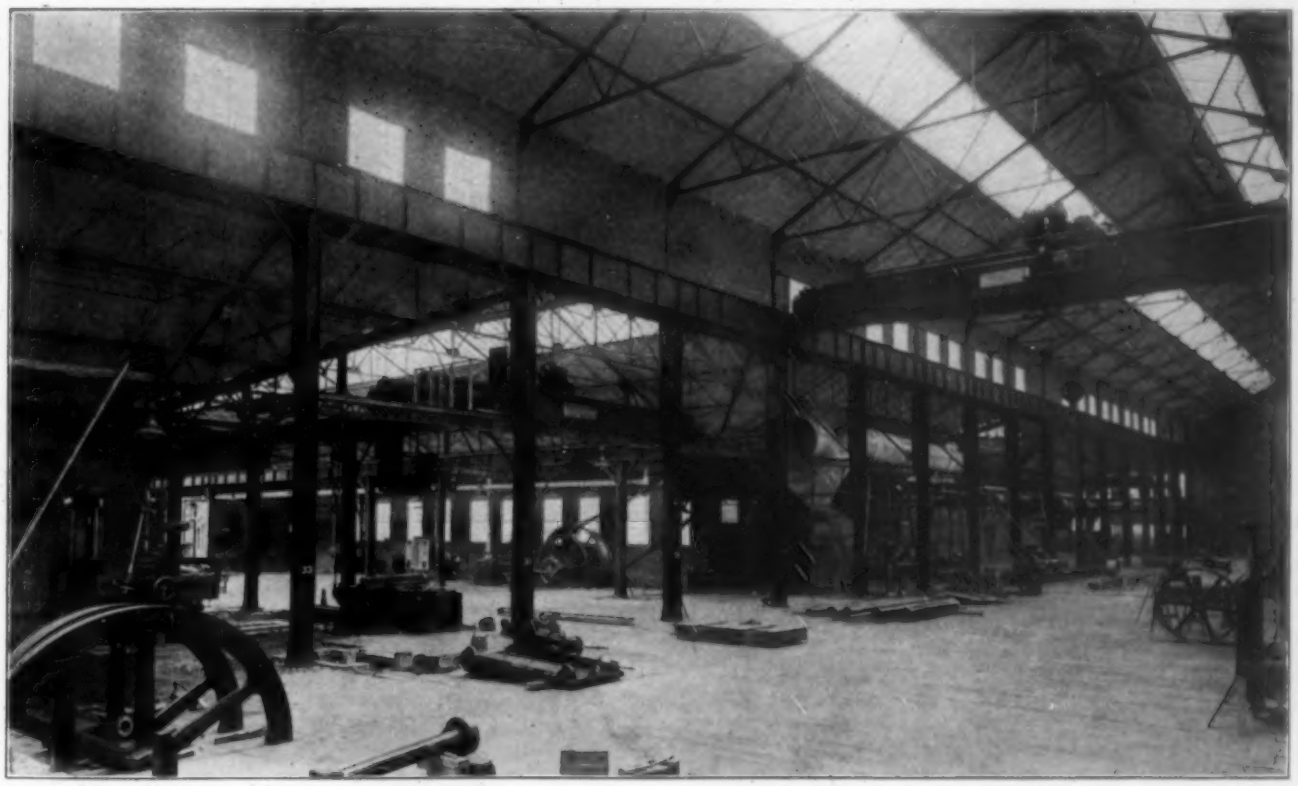


FIG. 4.—ENGINE ROOM AS SEEN FROM THE ERECTING SHOP.

The Manufacturers' Foundry Co., Waterbury, Conn., will build a new foundry, brick, one story, 80x400 feet.

THE ENGINEER'S STATUS IN THE NAVY.

A recent report of Engineer-in-Chief George W. Melville, as head of the Bureau of Steam Engineering, U. S. Navy, discusses the status and possibilities of the naval personnel bill.

FIG. 5.—BORING MILL DEPARTMENT AND SUPERINTENDENT'S OFFICE.

It is pointed out that during the three and a half years since the bill was made a law there would be good grounds for a decision as to the ultimate success of the project and yet it is but plain enough that one-half of the line officers on the active list of the Navy have yet to be convinced of the utility of amalgamating the duties of the deck and engineer officers. The case is even more pronounced among the retired officers and it is asserted that the exception is to find those who have any sympathy with the scheme or who do not predict an inefficient naval service as a result of the experiment. Indeed the revolutionary proposal to make every officer of the line a fighting engineer could not but evoke strong opposition. Conservatism is a natural consequence of the discipline which rests upon the red tape rules of the offensive and defensive forces of Governments everywhere. A procedure which stripped the lace and plumage from the deck officer and clothed him with overalls as occasion might demand was not relished by those who saw in the engineering work of a modern ship little more than the care of "steam tanks," as one of them suggested.

FIG. 6.—FOUNDRY.

However, the warship of today has long passed the stage of the sail-propelled vessel that was handled almost exclusively by a control from the deck. Today the warship is a gun plat-

form and in efficiency of propulsion, mechanism and management, is more than ever an engineering proposition. As an inevitable result the fighting machine with the constant strain for a high state of efficiency has brought out a well trained complement of skilled machinists. While the engineer-in-chief recognizes their limitations and holds that as a rule this class of officers can no more do the work of educated engineers than can carpenters take up the duty of naval construction, or gunners assume the responsibilities devolving upon ordnance experts, or boatswains attain the skill and executive ability of skilled sea commanders, yet these men, in his opinion, should have an opportunity whereby the elect might quickly secure commissions in the Navy. The belief that warrant machinists competent to take charge of the machinery of a modern warship will rest content with either the pay or position now accorded them is considered to be simply an invitation to another half century of internal strife, a revival of the conditions existing when the screw propeller was first used.

The engineer-in-chief frankly asserts the retrogression in naval engineering efficiency as a consequence of the belief prevalent in some quarters that the experience of a single cruise in the engine room will fit junior officers for the duty of a chief engineer, and that the practical duties at sea of the old engineer officers can be taken up by the warrant machinists. Attention is directed for a proof of this statement to a report of the paymaster-general of the Navy in answer to a Senate resolution calling for data as to the cost of repairs to naval vessels. This docoument is substantially a financial history of the ships of the new Navy and shows the heavy expense incurred in keeping the vessels in a state of efficiency. To meet this retrogression, Chief Melville holds that at least one-fifth of the 1,800 commissioned officers, midshipmen and warrant officers should be assigned to engineering duty.

While there are many young line officers who have shown a decided aptitude for engineering work and have been assigned to such duty yet the number who have specially interested themselves in this direction has been too small for the good of the service. There has also been the incubus of those who have taken up the work in an amateur fashion and as a diversion. The injury to engineering efficiency from countenancing this course is very great, as it demoralizes the enlisted force in the engine and fire rooms and tends to discredit the work in the estimation of those who should be made to interest themselves in the duty.

The principle involved in the amalgamation of the duties of line and engineer officers is claimed to be in accord with the trend of modern development and it is by reason of this fact that the proposition received the hearty and unqualified support of engineering interests throughout the country. It was indeed an official recognition by Congress of the dignity and importance of the engineering profession—a declaration also that an organization suitable for vessels of oak was not adequate to the needs of ships of steel, and that the men beneath the protective deck in the engine rooms and stokeholes were as much an integral part of the ship as the men who served and trained the guns. Rear Admiral Melville is at no loss to identify the influence, however, which stands in the way of a liberal and generous enforcement of the unwritten but well understood provisions of the personnel law and says plainly that the opposition commanded greater strength in the naval service than it did in Congress.

The civilian reader of the report will be astonished at the revelations in regard to the endangering of the service interests by the inadequate number of officers assigned to engineering duty on shore. There is in course of construction 250,000 h. p. of boilers of the Babcock & Wilcox design and the only officer available for the duty of inspection is a veteran of the civil war. He is on the retired list after 40 years of active service, but because of his special aptitude for the work has been continued on duty for the purpose of inspecting marine boilers of a design that may be selected as the approved navy type and therefore should not be entrusted to a junior officer who might be unexpectedly ordered to sea at short notice. About 125,000 h. p. of Niclausse boilers are also in course of construction and only one officer is available in this case also. It is urged that several junior officers be detailed as assistants to each of the engineer inspectors of these boilers. Evidently in the effort to keep ships going at sea important duties are being slighted on shore and there are excellent reasons for the assertion that the modern naval officer can not efficiently operate machines unless he has had experience in superintending their construction and installation.

The report does not ignore another salient fact in this connection and calls attention to the increased competition between shipbuilders for naval work and that there is not the margin of profit that was obtainable in the past by the contractors. Many of the plants now sublet considerable of their work and this entails more rigid inspection. Obviously the interests of the service are not subserved by frequent changes of inspectors, for the naval experts are pitted against highly paid specialists who are not only loyal and zealous in the cause of their employers but have an advantage over the naval officers by reason of their long assignment in connection with the work in hand. The report does not hesitate to make the blunt assertion that these causes make it certain that the ships now in course of construction will not be the equal of those built in the past so far as the motive power is concerned but this statement is not intended in any way to reflect upon the integrity of the builders; it is simply the outcome of the inadequate inspectorship.

The rear admiral recommends the establishment at the Naval Academy of an engineering experimental laboratory and the provision of a postgraduate course in engineering; the detail of junior officers as understudies to the officers on shore doing engineering duty; that promotion be denied junior officers of the line who have not sought duty in the engine room, that the Secretary of the Navy be empowered to permit graduates of the technological colleges to complete for acting commissions in the service; that the title of the bureau be changed to that of the Bureau of Engineering and that all machinery other than that of ordnance be placed under its jurisdiction. There are other recommendations looking to the increase of warrant officers, the extension of the system of instruction of second class machinists now in operation at the New York Navy Yard, etc.; but the above will be found of most interest to engineers generally. The opportunity suggested for technological graduates is intended to be coupled with a one year's instruction for the successful competitors, in ordnance, gunnery and navigation at the Naval Academy and then the work continued on board a modern warship—the completion of the course entitling the student to a permanent commission in the regular service. From this source it is possible to secure most excellent material and a well trained reserve. Such a system of increasing the personnel would bring the service nearer to the hearts of the people, for in the course of a single decade the alumni association of every great university would have some of its representatives holding commissions in the line. There is in this nothing more unreasonable than the well justified suggestion that the Bureau of Steam Engineering be enlarged to the design and control of mechanical, electrical, pneumatic and hydraulic engineering; but in each case the proposal to disturb an order of things carrying all the weight and sanctity of age is likely to be sternly discountenanced if not defeated. Nevertheless the vigorous and fearless language of the chief of the bureau is a welcome commentary on the engineering status of so superb an institution as the American Navy.

R. I. C.

The National Machinery Co., Tiffin, O., states that the condition of business was never better in its history. Orders received in the last 30 days were exceptionally heavy, and inquiries received indicate no falling off of the volume of trade for some time. The activity among the railroads has greatly increased the amount of business this fall, and the one difficulty is to make early deliveries, the condition of the raw material market being a great impediment. The company has had an exceptional year in the wire nail machine trade, but finds business equally good in all lines—bolt cutters, headers, bulldozers, spike machines, etc.

The Drake-Williams-Mount Co., Omaha, Neb., which manufactures boilers and does a general sheet iron work, is a new company which has started with excellent business. Everything in equipment line has been placed.

A TIME AND COST-KEEPING MACHINE.

The elimination of guesswork from shop and office practice is one of the leading factors in successful business management. The most carefully devised cost system must fare well or ill in proportion to the personal factors involved in its handling and the "human equation" becomes a serious source of inaccuracy at times. The most prolific cause of error is doubtless in the method of recording time—time being the all important element in computing the cost of labor; and the manager who does not know the labor cost of his manufactured product is constantly and aimlessly guessing in sheer helplessness. Most factory managers keep a close record of the cost of material entering into the goods they produce. Many shops have appliances of one sort of another for recording the time of day at which each workman enters or leaves the plant. The accounting department can usually furnish information to the management in reference to the total amount paid out in wages in any given period of time, the total amount of product turned out in that period and in this manner the average labor cost may be obtained. But when inquiry is made as to the exact amount and value of every different kind of labor that is expended upon any specific job, operation or lot of goods, the

FIG. 1.—CALCULAGRAPH MOUNTED ON PEDESTAL.

FIG. 2.—CALCULAGRAPH FOR ATTACHMENT TO DESK.

usual practice is to estimate it. So well is the difficulty understood of obtaining exactness in the clerical record if left to the workmen that many managers have cut the knot away entirely and detailed time keepers to visit the individual employes frequently and regularly for the collection of such data. This plan is sometimes improved by the introduction of machinery—mechanical time keeping devices. Both aspects of the latter solution will be of interest to readers of *The Iron Trade Review* and the subject may be considered purely as an improvement in cost keeping or as a useful addition to the machinery of the modern plant.

How to determine what each workman does while in the factory is a problem of vital moment to every manufacturer. How many hours and minutes does the workman put in on one job? How many on another piece of work? How much time is he idle? Some try to answer these questions by the aid of pencil, paper and a clock, the workman or a clerk, separately or maybe in combination, taking charge of the matter. Here enters a manifest source of mistakes, as experience teaches that the average clerk does not accurately record elapsed time by means of a pencil and a clock dial. He may read the time of starting work incorrectly, or having read it aright may write it down wrong. Either or both of these errors may occur again in recording the finishing time. When the commencing time of the day is substracted from the finishing time an additional opportunity for error is presented. The computation is not nearly so easy as subtracting decimal numbers. There are thus five chances for error in each record. The writer has been informed of a test made of one thousand such calculations of elapsed time covering the work of eighteen different time keepers. The results showed that more than 20 percent contained errors.

In order to meet this requirement a machine has been designed and is being introduced that will record elapsed time. A stop watch will show the length of a time interval but the instant the button is again pressed the record is wiped out forever. Even the ordinary time stamp is limited to the printing of the time of starting and stopping. The operation of subtraction to determine the time employed must still be performed with the usual possibility of error and at an additional cost. The machine under consideration, the calculagraph, makes a permanent record (printed on cards) not only of a single period of time—which is all the stop watch would show—but is capable of making an indefinite number of such records of elapsed time running concurrently; as many, in short, as the cards it is possible to push into the slot and pull levers for during the maximum period of time under test. Each card, when the second impression is made upon it, will show the correct length of time interval since the first impression was made on that card, without reference to the order in which they were started or finished. The last workman to commence work may be the first to stop and the record on his card will not affect the correctness of the others.

The machine is illustrated in Figs. 1 and 2. The former shows the machine mounted on a pedestal and the height is adjustable from 26 to 40 inches, measuring from the floor to the ticket plate. The other illustration is of the case ready for insertion into a cavity in a desk so that the top of the calculagraph will come flush with the surrounding surface. The levers are used in operating the printing dials and elapsed time may be recorded in long periods as "hours and minutes" or in shorter intervals, as "minutes and fractions of a minute," or the value of the elapsed time may be computed and recorded by engraving upon the printing dials figures representing dollars and cents and giving them such speed of rotation as will show earnings at a fixed rate per hour, as for example 12½ cets, 18¾ cents, 25 cents, etc. A change in the number of teeth in the gears which drive the dials will bring any desired result. The mechanical means employed to produce the above results are by no means complicated. They will be best understood by calling attention to the fact that the dial of an ordinary clock or watch is stationary while the hands (pointers) rotate, but in the calculagraph both dial and pointers rotate. They rotate in unison, but are capable of making printed impressions separately. On pulling the right hand lever forward the dials are impressed upon the card and thus the zero mark or starting point is fixed upon record. At the end of the time period the card is again inserted in the slot in the same position it occupied before and the left hand lever is operated, which impresses the position of the pointers upon the dials on the card; and since both the dials and pointers have moved forward in the instrument during the interval the pointers will appear when printed pointing toward these figures of the dials which represent the length of the interval. This description will answer the questions which are liable to arise on a cursory consideration of the instrument, and it will be evident that on the matter of elapsed time one machine will handle cards for an indefinite number of workmen and that pointers are not required to fly back to the zero mark after each impression.

The application of the calculagraph to a machine shop may be thus illustrated: Let us suppose that a certain machine is to be made which will require in the manufacture the labor of the draftsman, pattern maker, molder, blacksmith, machinist, painter, assembler, inspector, and the packer who makes the crate in which the product is shipped. The order will be entered upon the factory books, say as job No. 750. To each operative will be given a suitable ruled and printed card bearing the name or number of the workman and this job number. These cards are inserted in the slot of the calculagraph and one of the levers is operated at the time they are issued to the

workmen. A similar operation is performed, but with the assistance of the other lever, when a workman completes his part of the task and surrenders his card. The resulting record on the card will show the number of hours and minutes each workman expended upon job No. 750 and preferably also the time of day he commenced work.

A time card of this kind is illustrated in Fig. 3, showing that William Bailey, a milling machine hand, began work on job No. 750 at 9:45 a. m. and was so employed for 2 hours and 12 minutes. The hours are indicated on the dial (in the middle of the card) by a triangular pointer which moves outside the dial, the minutes being shown by an arrow inside the circle of figures.

Every workman who in his turn takes up job No. 750 will receive a similar card and if he is employed more than one day upon it there may be several cards bearing his name or number. All cards numbered 750 will be put into an envelope which is suitably ruled on the outside for recording the totals of the cards contained and is also numbered 750. Cards showing quantity and cost of materials purchased or supplied for job No. 750 may also be filed in the same envelope.

It will be the duty of the foreman's clerk or assistant to make out and issue these cards and upon their return fill in the rate per hour paid to the workman and also make the extensions showing the "cost of time employed" in the ruled space on each card, keeping this work up daily. When the job is completed, the totals of labor cost of each department or class of labor as shown on the cards will be entered on the outside of the envelope containing them, together with the record of material used and the proper percentage (predetermined) for shop expenses, such as rent, power, heat, light, insurance, superintendence, etc. These additional items will give the total cost of job No. 750. Such data as may be required for a permanent record, after being verified and audited, is entered upon the factory books or upon cards of any of the well known card index systems in use and the envelope and contents may be then filed away or destroyed. Of course the calculagraph records of each employe may be made directly upon cards of such systems for filing in cabinets and thus the envelope method may be discarded and the general plan so far simplified.

The machine is manufactured in a variety of forms, adapted to different business needs, by the Calculagraph Co., of New York.

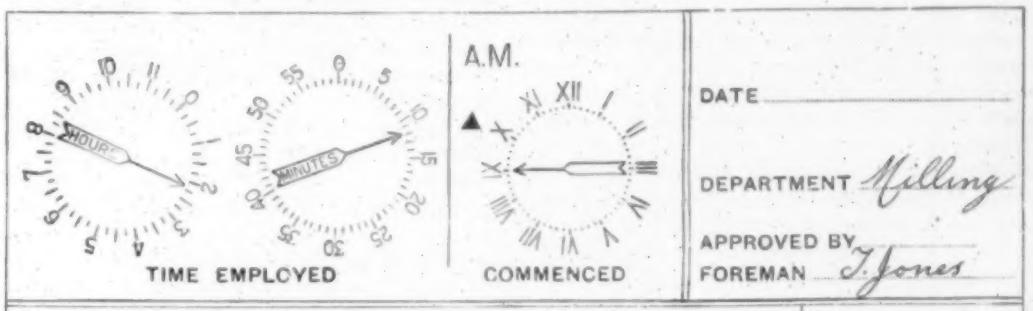


FIG. 3.—SPECIMEN OF CALCULAGRAPH TIME CARD.

F. H. Clergue and associates are soon to commence the erection of the works of the Algoma Tube Co., Ltd., Sault Ste. Marie, Ont. The company has secured the Perrin patents for the manufacture of seamless steel tubes, and will erect works of a very extensive scale, including puddling furnaces, rolling mills and tube works, with all the necessary finishing departments, and tubing of from 1½ to 12 inches will be the regular product. The largest size is the largest seamless tubing ever manufactured, and is not now made anywhere. The building for the drawing of these tubes will occupy about nine acres and a vast amount of electrical power, to be furnished by the company's canal, will he required.

THE DETROIT IGNITER.

The Detroit Motor Works, of Detroit, Mich., have designed and are now placing on the market a complete electric igniter for gas or gasoline engines. The company has been led to this course because its experience has shown that most gas engine troubles center at the igniter. It is held that tube, touch spark and wipe ignition are seriously defective on the following grounds. The tube requires frequent renewal, as an old tube will cause the engine to miss explosions and the charge will be fired in the exhaust pipe. Considerable fuel is used to heat the tube and ten to fifteen minutes are required to start. It is also unsafe to have a flame in a closed room where there is any possibility of gasoline being exposed to the air. The touch spark igniter has a moving electrode through the cylinder walls and the burnt gas and intense heat causes this igniter to stick, corrode and give trouble, while the points become covered with deposits from the gas and thus render the sparks uncertain. A wide spark igniter is subject to frequent breakage and rapid wear, which soon interferes with the proper point of ignition, while with the ordinary device there is little or no provision for changing the point of ignition for starting the engine.

The Detroit igniter permits of readily shifting the commutator handle for late ignition to start the engine and afterwards the lever can be adjusted to give any desired point of ignition. With this igniter there are no moving parts on the inside of the cylinder and therefore nothing to gum or stick. The sparking plug screws through the cylinder wall into the combustion space so that it can be removed in a moment's time for inspection or cleaning. The spark jumps between the points at the end of the plug, these points are about 1-32 inch apart, the spark taking place when the brushes come into contact with the copper strip in the commutator roll. It is claimed that this igniter is quite frequently run with but two dry cells.

The foundry plant of the Morgan Iron Works, Spartanburg, S. C., capitalized at $50,000, is to be sold at auction on Dec. 1, to satisfy the claims of creditors. The upset price is $27,000.

We have received from the publishers, the Fairman-Gray Publishing Co., of Philadelphia, a copy of "Philadelphia's Investors," a cloth-bound octavo of 250 pages. It gives a list of about 5,000 persons in Philadelphia and vicinity who have $5,000 or over for investment or at interest. Months have been spent in the preparation of the work, the information being obtained in all cases from official records. The book will prove a valuable directory for the use of bankers, trust companies, investment brokers, bond houses and others.

The I. S. Spencer's Sons' Co., Guilford, Conn., recently incorporated, is simply a reorganization of the old firm of I. S. Spencer's Sons, made necessary by the death of C. Spencer. The firm will be continued along the same lines as heretofore.

Pittsburg District Iron and Steel Plants and Their Railroad Connections.

Travelers through Pittsburg cannot fail to be impressed with the magnitude of the tonnage sent out by its varied industries, and the enormous traffic of its crowded railroad terminals. In iron and steel, easily first of producing centers in the United States, it also outranks any district of similar extent in the world. Its proximity to the extensive Pennsylvania and West Virginia bituminous coal fields was early recognized by iron masters as the potent factor in the economic operation of blast furnaces, and has resulted in the expenditure of millions of dollars in the erection of iron and steel plants in that territory. Nor has the territory reached its maximum growth, despite the fact that the three great waterways—the Allegheny, Monongahela and Ohio Rivers—have their banks for miles dotted with furnaces and mills. It is true that the stretch of territory devoted to industries is growing greater, but only for the reason that suitable land is no longer available in the immediate vicinity of the city for great establishments which have been forced to locate a few miles further up the Monongahela River.

The map presented herewith shows the growth of the district down the Ohio River as far as Neville Island, where the American Steel & Wire Co. built its last modern blast furnace plant. On the Allegheny River the iron and steel plants are indicated as far as Sharpsburg, while up the Monongahela River the greatest development is indicated up to Monessen.

New operations at present are almost entirely limited to the banks of the Monongahela River, where such great independent steel interests as the Union Steel Co., Clairton Steel Co. and the Pittsburg Steel Co. are expending upward of $25,000,000 in extending the growth of Pittsburg as an iron and steel center. The Carnegie Steel Co. is also increasing its plant at a cost of nearly $10,000,000 while the National Tube Co. only recently appropriated $10,000,000 for the extension of its great works at McKeesport. Minor extensions throughout the entire district are too numerous to mention, but the cost of these will run well up into the millions.

In this comparatively small territory is located a very large percentage of the tangible property of the United States Steel Corporation, and its mills in this district produce more than one-half of the entire output of the finished material produced by the corporation. It operates no less than 41 plants distributed as follows among the constituent companies: American Bridge Co., five; American Sheet Steel Co., one; American Steel Hoop Co., five; American Steel & Wire Co., eight; American Tin Plate Co., five; Carnegie Steel Co., eight, and National Tube Co., nine. The Crucible Steel Co. of America has seven Pittsburg district plants, while the Jones & Laughlin Steel Co. has five plants in operation, with a greater output of steel than any other independent iron and steel company in the country. The Pressed Steel Car Co. operates three immense plants, with an annual output of 45,000 steel cars while the great Westinghouse interests, although not directly identified with the production of iron and steel products, have five immense plants in operation.

Thirty-four blast furnaces with a yearly estimated production of 4,960,000 gross tons are now active, of which the constituent companies of the United States Steel Corporation operate 28 with a capacity of 3,980,000 tons and independent interests operate the remaining six with an output of 980,000 tons. Three immense blast furnace stacks are now under erection, while four additional have been projected. The Carnegie Steel Co. has three under erection, one at its Carrie plant at Rankin, which will be ready to commence operations about the first of the year, and two stacks at the Edgar Thomson plant at Braddock which will be blown in about the same time. The Clairton Steel Co. has three under erection at its new plant at Clairton, one of which will be blown in about the first of the year, while the remaining two will be producers before July 1, 1903. The Union Steel Co. will have two modern stacks completed at Donora within a year. With these new furnaces in operation the output of the Steel Corporation's furnaces will be increased about 500,000 tons annually while the independent steel producers will increase the district's production 750,000 tons, and the total annual pig iron output of the Pittsburg district within a year will be increased to nearly 6¼ million tons. The Pittsburg Steel Co., whose plant is located at Monessen, has under consideration the erection of a large modern blast furnace plant in connection with its finishing mills, and there is every indication that three modern furnaces with an annual output of 500,000 tons will be built. Among the smaller blast furnace operations contemplated is the erection of a small furnace by the Monongahela Iron & Steel Co. at Hays Station with an estimated output yearly of 50,000 tons. With the furnaces under erection and those contemplated, the iron output of the district will be increased to nearly 7,000,000 tons early in 1904.

While the increase in the steel producing capacity of the district is not nearly as large as that of pig iron, it is for the reason that the iron capacity has long been much short of the steel making requirements, and the increase in the blast furnace capacity of the United States Steel Corporation is for the purpose of equalizing the two. On the other hand the new operations of the large independent interests, such as the Union Steel Co. and the Clairton Steel Co., have resulted in adding to the steel production to the extent of nearly 750,000 tons by the recent completion of large open-hearth plants, while the Jones & Laughlin Steel Co. has increased its steel output about 250,000 tons by the building of the largest Talbot open-hearth furnace ever erected, and the recent addition of a Bessemer converter to its South Side plant.

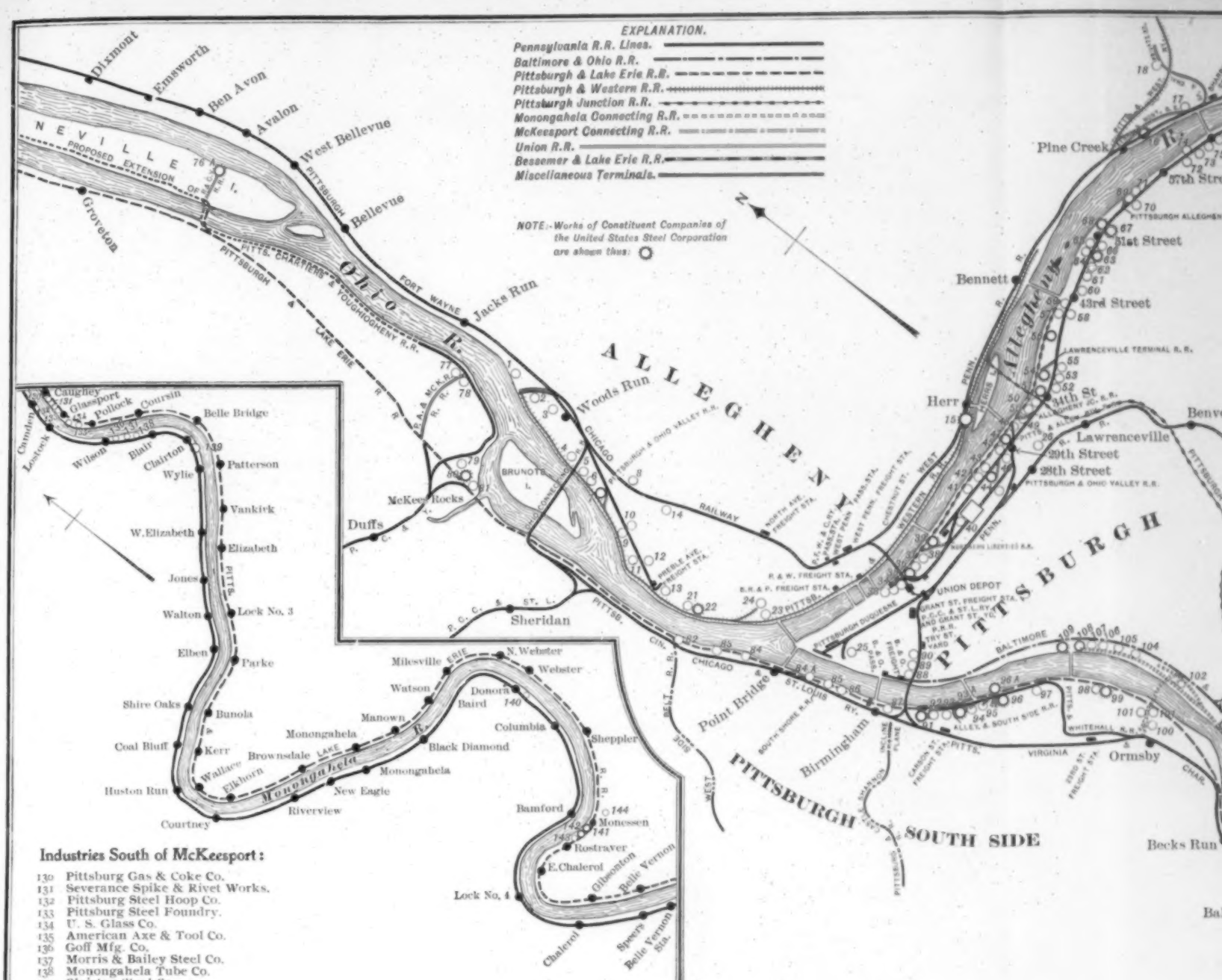
As the steel producing capacity is being increased the rolling capacity must be added to and among the largest installations under way are the blooming, rail and billet mills at the South Side plant of the Jones & Laughlin Steel Co., angle mill at the Homestead plant of the Carnegie Steel Co., and the Clairton Steel Co. only recently completed the installation of a large blooming mill. At Homestead the Carnegie Steel Co. is doubling its armor plate capacity to meet the government's requirements, and the annual output of armor plate will be increased to about 10,000 tons.

The finished products of the mills in this district comprise all the rolled products in iron and steel manufacture, and while the heavy material, such as plates, structural shapes and rails, predominates the tonnage of the lighter material is very great. The foundry output is largely devoted to heavy machinery, such as is required in the rolling of iron and steel products, making the tonnage very large, but there are many plants devoted to the casting of smaller pieces such as the railways require in their equipment. The production of railway equipment of the district must not be overlooked, a large contribution being made by the plants in the Pittsburg district, comprising locomotives, couplers, air brakes, signaling devices, steel cars, rails and miscellaneous products.

While the railroad facilities for handling the material for these plants are great, they are not nearly large enough to take care of the tonnage offered with the dispatch required and an increase by nearly 50 percent in the yard facilities of the lines handling the product of the district should be made to meet the requirements at the present time. Nearly all of the large steel companies operate their own terminal lines and the Bessemer & Lake Erie railroad is the largest artery operated by the steel interests connecting the plants of the Carnegie Steel Co. with Conneaut, O., the greatest ore receiving port on Lake Erie.

Other steel making interests have also become interested in the erection of a road connecting with Lake Erie at Girard, O., and the entrance of the Wabash Railroad into Pittsburg will no doubt relieve the great congestion in the railroad yards to a considerable extent.

The Allen G. Williams Co., Baltimore, dealer in machinery, shafting, hangers and pulleys, recently incorporated, has commenced operations at 214 N. Holliday St. No arrangements for building have yet been made.



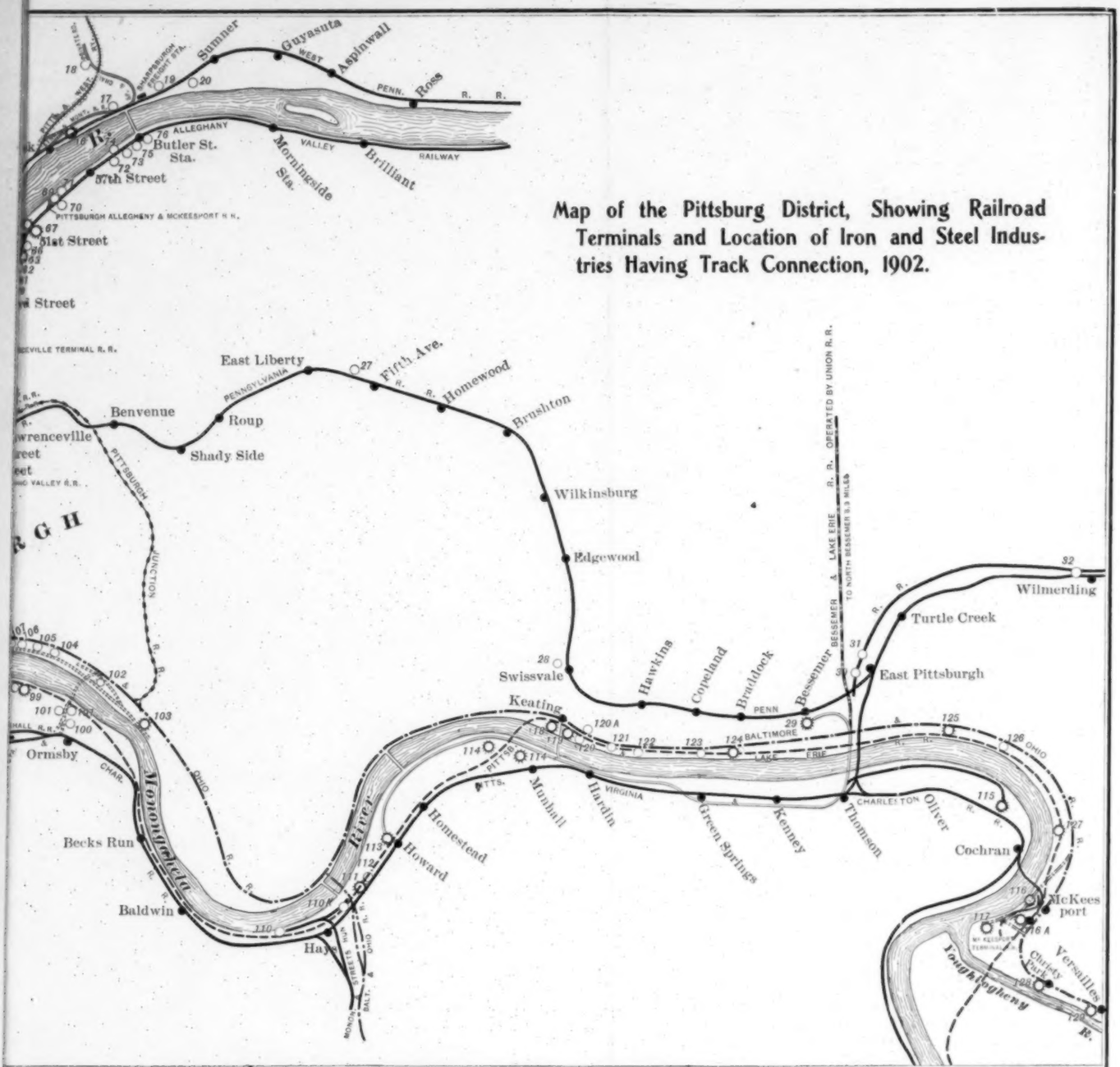
Industries South of McKeesport:

130 Pittsburg Gas & Coke Co.
131 Severance Spike & Rivet Works.
132 Pittsburg Steel Hoop Co.
133 Pittsburg Steel Foundry.
134 U. S. Glass Co.
135 American Axe & Tool Co.
136 Goff Mfg. Co.
137 Morris & Bailey Steel Co.
138 Monongahela Tube Co.
139 Clairton Steel Co.
140 Union Steel Co.
141 *American Tin Plate Co.*
142 *American Steel Hoop Co.*
143 Page Woven Wire Co.
144 Pittsburg Steel Co.

INDUSTRIES NUMERICALLY ARRANGED.

(Constituent Companies of the U. S. Steel Corporation are in Italics)

1. Pittsburgh Forge & Iron Company.
2. Pressed Steel Car Co., (Allegheny Plant).
3. P. Wall Mfg. Co.
4. Riter & Conley Co. (Allegheny Plant)
5. Pennsylvania Car Wheel Co.
6. Pennsylvania Casting & Machine Co.
7. *American Steel & Wire Co., Allegheny (Blast Furnace) Plant.*
8. Carlin Mfg. Co.
9. Pittsburgh Stove & Range Co., Plant "C."
10. Pittsburgh Locomotive & Car Works.
11. Rosedale Foundry Co.
12. Follansbee Bros. Co.
13. Liggett Spring & Axle Co.
14. Enterprise Foundry Co.
15. Thos. Carlin's Sons.
16. *American Steel Hoop Co. Isabella Furnace Plant.*
17. Spang Chalfant & Co.
18. Spang Chalfant & Co.
19. Moorhead Bros. Co., Inc.
20. Pittsburgh Stove & Range Co., Plant "K."
21. Crucible Steel Co. of America, LaBelle Works.
22. *Crucible Steel Hoop Co., McCutcheon Plant.*
23. Taylor, Wilson & Co.
24. Hall Steam Pump Co.
25. Riter-Conley Mfg. Co., Pittsburgh Plant.
26. Jas. McNeil & Bro., (Dipping Plant).
27. Ferguson Tin Plate Co.
28. Union Switch & Signal Co.
29. *Carnegie Steel Co., Edgar Thomson Works.*
30. Westinghouse Machine Co.
31. Westinghouse Electric & Mfg. Co.
32. Westinghouse Air Brake Co.
33. R. D. Nuttall & Co.
34. Pennsylvania Drop Forge Co.
35. Brown & Co.
36. *American Tin Plate Co. Star Plant.*
37. McIntosh, Hemphill & Co.
38. Zug & Co.
39. *American Steel & Wire Co., Shoenberger Plant.*
40. Crucible Steel Co. of America. Howe Works.
41. Oil Well Supply Co.
42. R. Munroe & Son.
42A. W. J. Carlin.
43. American Steel Casting Co.
44. *American Steel & Wire Co., 26th St. Plant.*
45. Marshall Foundry & Structural Co.
46. Scaife Foundry & Machine Co.
47. *Carnegie Steel Co. Lower Union Mills.*
48. Crucible Steel Co. of America. Park Works.
49. Carbon Steel Co.
50. Wm. Yagle & Co.
50A. National Supply Co.
51. *Carnegie Steel Co. Upper Union Mills.*
52. Pittsburgh Malleable Iron Co.
53. Columbia Iron & Steel Co.
54. *American Steel Hoop Co. Clark Plant.*
55. Reliance Steel Casting Co.
56. *American Bridge Co. Pittsburgh Plant.*
57. Epping-Carpenter Co.
58. Seaman Sleeth Co.
59. S. B. Rheam & Co.
60. Wickes Bros.
61. Velte Foundry & Machine Co.
62. Pittsburgh Shear, Knife & Machine Co.
63. *American Bridge Co. Shiffler Plant.*
64. McConway & Torley Co.
65. Crucible Steel Co. of America. Crescent Works.
66. H. K. Porter & Co.
67. *American Bridge Co. Keystone Plant.*
68. *Carnegie Steel Co. Lucy Furnace.*
69. Pressed Steel Car Co. Pittsburgh Plant.
70. Hydraulic Machine Co.
71. Frank-Kneeland Machine Co.
72. Union Foundry & Machine Co.
73. Lincoln Foundry Co.
74. Pittsburgh Crushed Steel Co.
75. Union Steel Casting Co.
76. Hubbard & Co.
76A. *American Steel & Wire Co. (Neville Island Plant).*
77. Pressed Steel Car Co. McKee's Rocks Plant.
78. Pennsylvania Malleable Co.
79. Lockhart Iron & Steel Co.
80. *American Bridge Co. Shultz Plant.*
81. Crucible Steel Co. of America. Anderson Dupuy Works.
82. United States Tube & Iron Co.
83. Crucible Steel Co. of America. Singer Works.
84. *American Steel Hoop Co. Painter Plant.*
84A. Union Foundry & Machine Co.
85. Clinton Iron & Steel Co.
86. Phillips Nimick & Co.
87. Westinghouse Machine Co. South Side Foundry.
88. Wilson, Snyder Mfg. Co.
89. Bovaird & Seyfang.
90. Jones & Laughlin's Warehouse.
91. *American Steel & Wire Co. South Side Plant (Wire and Nail Mill.)*
92. Dilworth, Porter & Co.
93. A. M. Byers & Co.
93A. *American Steel & Wire Co. South Side Plant (Rod Mill.)*
94. A. Garrison Foundry Co.
95. Oliver Iron & Steel Co.
96. *American Tin Plate Co. Monongahela Plant. (Black Plate.)*
96A. *American Tin Plate Co. Monongahela Plant. (Tin Plate.)*
97. Anchor Nail & Tack Works.
98. Marland Neely & Co.
99. *National Tube Co. Republic Iron Works Dept.*
100. M. Lanz & Son.
101. Jones & Laughlins. American Works.
102. Jones & Laughlins. Eliza Furnaces.
103. *National Tube Co. Continental Dept.*
104. American Smelting & Refining Co.
105. Keystone Rolling Mill.
106. Jones & Laughlins. Soho Dept.
107. Jones & Laughlins. Soho Furnace.
108. *National Tube Co. Pittsburgh Dept.*
109. *National Tube Co. Pennsylvania Dept.*
110. Monongahela Iron & Steel Co.
110A. *Keystone Car Wheel Co.*
111. *American Bridge Co. Walker Plant.*
112. Mesta Machine Co.
113. *Carnegie Steel Co. Howard Axle Works.*
114. *Carnegie Steel Co. Homestead Works.*
115. *Carnegie Steel Co. Duquesne Works.*
116. *National Tube Co. National Dept. (Furnaces).*
116A. *National Tube Co. National Dept. (Tube Works).*
117. *American Sheet Steel Co. Wood Plant.*
118. *Carnegie Steel Co. Carrie Furnace.*
119. *American Steel & Wire Co. Rankin Plant.*
120. Duquesne Forge Co.
120A. Pittsburgh Steel Shafting Co.
121. Chess, Cook & Co.
122. Standard Chain Co. Braddock Plant.
123. Braddock Machine & Mfg. Co.
124. *American Steel & Wire Co. Braddock Plant.*
125. *American Tin Plate Co. United States Plant.*
126. Firth-Sterling Steel Co.
127. *National Tube Co. Boston Iron & Steel Co. Plant.*
128. *National Tube Co. U. S. Seamless Dept.*
129 *National Tube Co. Galvanizing Works.*



Map of the Pittsburg District, Showing Railroad Terminals and Location of Iron and Steel Industries Having Track Connection, 1902.

INDUSTRIES ALPHABETICALLY ARRANGED.

	American Bridge Co.	
	Keystone Plant	67
	Pittsburg Plant	56
	Schultz Plant	80
	Schiffler Plant	63
	Walker Plant	111
	American Sheet Steel Co.	
	Wood Plant	117
	American Smelting & Refining Co	104
	American Steel Hoop Co.	
	Clark Plant	54
	Isabella Furnace Plant	16
	McCutcheon Plant	22
	Painter Plant	84
	American Steel Casting Co	43
	American Steel & Wire Co.	
	Allegheny (Blast Furnace) Plant	7
	Braddock Plant	124
	Neville Island Plant	76A
	Rankin Plant	119
	Shoenberger Plant	39
	South Side Plant (Wire & Nail Mill)	91
	South Side Plant (Rod Mill.)	93A
	26th Street Plant	44
	American Tin Plate Co.	
	Monongahela Plant. (Black Plates)	96
	Monongahela Plant (Tin Plates)	96A
	Star Plant	36
	United States Plant	125
	Anchor Nail & Tack Works	97
	Braddock Machine & Mfg. Co	123
	Brown & Co	35
	Byers, A. M., & Co	93
	Bovaird & Seyfang	89
	Carbon Steel Co	43
	Carlin Mfg. Co	8
	Carlins, Thos., Sons	15
	Carlin, W. J	42A
	Carnegie Steel Co.	
	Carrie Furnace	118
	Duquesne Works	115
	Edgar Thomson Works	29
	Homestead Works	114
	Howard Axle Works	113
	Lower Union Mills	47
	Lucy Furnace	68
	Upper Union Mills	51
	Chess, Cook & Co	121
	Clinton Iron & Steel Co	85
	Columbia Iron & Steel Co	53
	Crucible Steel Co. of America.	
	Anderson Dupuy Works	81
	Crescent Works	65
	Howe Works	40
	La Belle Works	21
	Park Works	48
	Singer Works	83
	Dilworth, Porter & Co	92
	Duquesne Forge	120
	Enterprise Foundry Co	14
	Epping Carpenter Co	57
	Ferguson Tin Plate Co	27
	Firth-Sterling Steel Co	126
	Follansbee Bros. Co	12
	Frank Kneeland Machine Co	71
	Garrison, A., Foundry Co	94
	Hall Steam Pump Co	24
	Hubbard & Co	76
	Hydraulic Machine Co	70
	Jones & Laughlins, Ltd.	
	American Works	101
	Eliza Furnaces	102
	Jones & L. Warehouse	90
	Soho Department	106
	Soho Furnace	107
	Keystone Rolling Mill	105
	Keystone Car Wheel Co	110A
	Lauz, M. & Son	100
	Liggett Spring & Axle Co	13
	Lincoln Foundry Co	73
	Lockhart Iron & Steel Co	79
	Marland Neely & Co	98
	Marshall Foundry & Structural Co	45
	McConway & Torley Co	64
	Mesta Machine Co	112
	McIntosh, Hemphill & Co	37
	McNeil, Jas. & Bro. (Dipping Plant)	26
	Monongahela Iron & Steel Co	110
	Moorehead Bros. Co., Inc	19
	Munroe R. & Son	42
	National Supply Co	50A
	National Tube Co.	
	Boston Iron & Steel Co. Dept	127
	Continental Department	103
	Galvanizing Works	129
	National Dept. (Furnaces)	116
	National Dept. (Tube Works)	116A
	Pennsylvania Department	103
	Pittsburgh Department	108
	Republic Iron Works Dept.	99
	U. S. Seamless Dept	128
	Nuttall, R. D. & Co	33
	Oil Well Supply Co	41
	Oliver Iron & Steel Co	95
	Pennsylvania Car Wheel Co	5
	Pennsylvania Casting & Machine Co	6
	Pennsylvania Drop Forge Co	34
	Pennsylvania Malleable Co	78
	Phillips, Nimick & Co	86
	Pittsburgh Steel Shafting Co	120A
	Pittsburgh Crushed Steel Co	74
	Pittsburgh Forge & Iron Co	1
	Pittsburgh Locomotive & Car Works	10
	Pittsburgh Malleable Iron Co	52
	Pittsburgh Shear Knife & Machine Co	62
	Pittsburgh Stove & Range Co.	
	Plant "C."	9
	Plant "K."	20
	Porter, H. K. & Co	66
	Pressed Steel Car Co.	
	Allegheny Plant	2
	McKees Rocks Plant	77
	Pittsburg Plant	69
	Reliance Steel Casting Co	55
	Rheam, S. B. & Co	59
	Riter-Conley Mfg. Co.	
	Allegheny Plant	4
	Pittsburgh Plant	25
	Rosedale Foundry Co	11
	Scaife Foundry & Machine Co	46
	Seaman-Sleeth Co	58
	Spang Chalfant & Co	17
	Spang, Chalfant & Co	18
	Standard Chain Co.—Braddock Plant	122
	Taylor, Wilson & Co	23
	Union Foundry & Machine Co	84A
	Union Foundry & Machine Co	72
	Union Steel Casting Co	75
	Union Switch & Signal Co	28
	United States Tube & Iron Co	82
	Velte Foundry & Machine Co	61
	Wall, P. Mfg. Co	3
	Westinghouse Air Brake Co	32
	Westinghouse Electric & Mfg. Co	31
	Westinghouse Machine Co	30
	Westinghouse Machine Co. (South Side	87
	Wickes Bros	60
	Wilson-Snyder Mfg. Co	88
	Yagle, Wm. & Co	50
	Zug & Co	38

THE IRON TRADE REVIEW

A Simple System of Shop Cost Keeping.

BY D. N. DUNLOP.

The main factors of industrial success are excellence in workmanship, economy in production, increased output, and a right appreciation of the practice of scrapping, the whole dominated by a spirit of enterprise, tempered by experience and realized by means of an intelligent and well-thought-out organization.

The initial step in securing this thoroughly efficient organization is to institute a complete system of record-keeping throughout the establishment by means of cards which, as we have already seen, afford endless facilities that lie quite outside the possibilities of ledgers and bound sheets of any kind.

The principles of the organization of factories, workshops, etc., and the various methods of cost and record-keeping are taught in most of the American technical colleges, whereas in Great Britain the subject has received but little attention, and manufacturers who have adopted or evolved a system working successfully are very jealous of revealing their methods. This policy of reticence is a mistake, for the advantages of comparison are uncontrovertible and trade secrets need never thereby be revealed.

Advantages of Accurate Cost Keeping.

The manufacturer will readily understand the immense power and advantage to be derived in these days of keen competition from an accurate and easily accessible knowledge of his costs in every department. There is no information placed before the manufacturer that is more important than an accurate computation of the cost of manufacturing each separate article which he sends forth into the markets of the world. Only by means of this information can he safely quote a sale price that will at the same time secure a brisk business and a sure and fixed profit.

A perfect system of cost records carried out to the letter is the only absolutely safe guide in tendering for contracts. To secure a profitable contract, a manufacturer whose goods have a reputation for excellence must draw up his tender on an absolute basis of accurate facts and figures brought up to date, and not on hypothesis or even approximate figures.

The manufacturer of a standard line of goods is often tempted to be guided in fixing his selling prices by those of his competitors—a dangerous method of working in the dark which amounts to nothing short of speculation.

A system of factory records should be made with the following aims kept in view: (1) To lessen the cost of production; (2) to estimate the cost of products collectively and in detail; (3) to fix the sale price of the article on a safe basis.

A Simple Cost System.

A simple cost system would be welcomed by the majority of managers who have, until now, done without it, as a means of combating the keen competition which is steadily on the increase. Although excellent systems, both simple and complex, have become general in the United States, where they work smoothly, the change is not easy to effect in England on account of the difference in the labor conditions, and of the difficulty in overcoming the workmen's antipathy for pen or pencil and his reluctance to adopt any innovation.

The following simple system given in outline is intended to serve as a foundation, which the manager of the firm will elaborate so as to suit his own requirements, or from which he may derive some suggestion beneficial to the organization of his establishment.

Machine..... Unit..... Section..... Bin ..... Shelf.....

Date.	Received.	Issued.	On Hand.	Cost.			Date.	Received.	Issued.	On Hand.	Cost.		
				£	s.	d.					£	s.	d.
Brot Fwd.							Brot. Fwd.						

repairs or improvements to the plant or building; any work, in fact, which will become an addition to the plant or an expense-charge to the business.

On receipt of an order from a customer, or of the acceptance of a tender, the manager takes the initial step in production by

Some managers send a duplicate of the working list in full to the stores-keeper and to each foreman, and, in addition, general and special instruction sheets containing every detail and the time in which it must be completed.

The stores-keeper has charge of the material, and by the use of the card-system, the exact amount of material received, issued, and the balance on hand, with the cost of the same, can be ascertained at any moment. The material-cards, therefore, and the machine schedule together form a record of all material from its entrance into the factory till its exit as a finished product.

Order No..... **ORDER FOR SUPPLIES AND MATERIAL.** Date.....

For what part Dept.

Quantity.	Material.	Price.	Value. £	s.	d.
380	1 1-16 N 29 R Crank				
1015	¾ "L"				
4050	1¾ Westfield Crank				
3182	1¾ and 1 Han. Bar Shl. Head				
1024	1 in. M 29 Fork Crown				

Foreman

FIG. 2.—MATERIAL ISSUED CARD.

authorizing each department of the factory to set to work. All firms have their own methods of dealing with orders. The usual plan of keeping an order-book is being superseded by a cabinet of order cards, each order being entered as received, numbered and marked with necessary references to estimate, tender, and letter, and probably also to the customer cabinet.

The order cabinet is accessible only to the manager and his clerk. The first step is to give instructions to the drawing-office in writing, either by letter or card, or by sending for the drawing-office order-book and making the required entry. It is in this department that the drawings are made or collected for the forthcoming work and the working lists prepared, providing full instructions for all foremen and officials concerned in the manufacture of the article down to the smallest detail.

The working list is, in fact, a specification of everything required for the order, and from this list the superintendent or the manager makes out all production orders separately to each department; a duplicate copy being retained and filed by the production order-clerk.

2 in. Single Leather Belt. 1 Unit.....Feet.....

Date.	Ord. No.	Quantity.	Price.	Cost.	Total Cost.	Date.	Ord. No.	Quantity.	Price.	Cost.	Total Cost.
4/12	1	12	15			Forward					
3/6	2	6									

FIG. 3.—MATERIAL CARD KEPT BY STOCKKEEPER.

Two separate sets of cards are required: one for the stock-keeper for requisitions of material addressed to the manager or superintendent to replenish his stores, and another for material issued to the various departments of the factory. The material requisition-card bears on a tab the name of the material or article; the space below is ruled horizontally for entering the section in which it is kept, and the bin number, the unit of measurement or the part of machine, and the shelf number; the rest of the space is ruled in vertical columns for *date received, issued, on hand, cost*, both sides of the card being alike.

The "material issued card" bears on the tab the order number, and below, in horizontal spaces, the date, the foreman's

punch or signature, for what part of machine or product it is wanted, and the department to which it is issued; the rest of the card is divided into columns for *quantity*, *material*, and *price*. This card contains all the material required by the foreman for the work of his department in the order, and the stock-keeper, after checking the card and issuing the material, transfers the separate materials from the foreman's card on to corresponding material cards and makes his balance, afterwards forwarding the two cards to the stores ledger-clerk, who registers both in his ledger (which should also consist entirely of cards in a cabinet), and returns them to their departments.

The Three Kinds of Labor.

Labor in manufacturing is divided into three classes: (1) Productive labor, which converts raw material into a finished product; (2) department non-productive labor, essential to productive labor, but not producing anything itself, such as that of foremen, clerks, sweepers, oilers, etc., etc.; (3) general non-productive labor, necessary for the operation of the producing department, such as shipping department, stock-room, timekeeper, engineer, etc. All three kinds of labor must be reckoned in the costs, the result corresponding to the pay-roll for the period considered.

In order to handle labor profitably in connection with this system, piece-work prices should be established in all departments, for this simplifies records, reduces the clerical pay-roll, and effects a saving in the cost of manufacture; piece-workers usually producing more work in a given time than day-workers. In that case, each of the manufacturing departments would be provided with a small card cabinet in which the record of the piece prices for the department is kept.

Mechanical Time Recorders.

Each factory has some system of record keeping for the time of each man's arrival and departure from the works. Time boards and check systems are mostly in vogue in England, but they will, in time, probably give place to the use of a mechanical recorder. This is a clock that prints the time of arrival and departure on a card. All the men have to do on receiving their card from the timekeeper is to drop it into a slot, press the lever, take out the card, and hand it to the timekeeper, who uses it to make up his pay-roll.

The foreman now being in possession of his instructions and material proceeds with the work. He assigns to each workman his job, giving him a time-card on which every item but the time is filled up. The tab bears the order number, and the card is spaced for entering the date, a description of the work to be done, the workman's name and number, and time columns *started* or *stopped* or *quit* by tens of minutes from opening till closing time.

One job only is recorded on each card, the workman making a cross over the time when he begins and finishes it. These cards are handed to the foreman for his O. K. punch, and he sends them to the cost-clerk, who registers each and distributes the facts on their various ledger cards, figuring out the productive labor, and adding this to the material figures received from the stores department. This done, he hands over all the time-cards to the time keeper, who checks the total labor per man by the arrival and departure record-cards from which the pay-roll is made out.

British Workman and Clerical Work.

Bearing in mind the extreme reluctance of the British workman to engage in clerical work of any kind, with the consequence that many minutes are wasted and that he puts off his entry till the last minute and often forgets it altogether, a system which does away entirely with all use of the pencil is to be recommended. The mechanical time recorder can again here be used to advantage. The workman, on receiving his job card (which need only have two spaces left for the time entries) from the foreman, puts it into the slot, presses the lever, and withdraws the card, on which the exact time will be found printed under "start"; he hangs the card up before him until the job is finished; goes through the same performance with the recorder, takes his card to the foreman to be examined and punched; and receives another for the next job.

The Manufacturing Expense.

The manufacturing expense comprises the supplies used for the factory, such as belting, emery cloth, sand paper, emery wheels, grindstones, files, twist drills, wood bits, planes, knives, buckets, brooms, maps, stationery, fuel, etc., which should be given out from the storesroom on card requisition from the department to which it is charged at proper value.

A two-drawer cabinet will suffice for supplies in the storeroom of a medium factory. It is best to sort the cards by using guide cards for the name of the supply article, the department number being entered on the tab of the card. The faces of the card contain the supply article and unit as heading, with columns ruled for date, order number, quantity, price, cost and total cost—this for keeping the cost-total up to date. The manufacturing expense is then pro-rated over the cost of machines and the same is done with the general expenses, which include all expenses not connected specially with any one department of the factory, such as power, general lighting and heating, salaries of the staff, etc.

The manager's cost-clerk acts as paymaster, and the production-order-clerk is also purchasing-clerk. The stores-ledger-clerk is responsible for all records of material until they are turned over to the cost-clerk.

The acting manager needs a stenographer, a filing clerk, a bookkeeper (the accounts are all kept on the card system), and an order clerk, who handles the shipping orders and is assistant bookkeeper.—[Page's Magazine.

Started.						Quit.					
6	10	20	30	40	50	6	10	20	30	40	50
7	10	20	30	40	50	7	10	20	30	40	50
8	10	20	30	40	50	8	10	20	30	40	50
9	10	20	30	40	50	9	10	20	30	40	50
10	10	20	30	40	50	10	10	20	30	40	50
11	10	20	30	40	50	11	10	20	30	40	50
12	10	20	30	40	50	12	10	20	30	40	50
1	10	20	30	40	50	1	10	20	30	40	50
2	10	20	30	40	50	2	10	20	30	40	50
3	10	20	30	40	50	3	10	20	30	40	50
4	10	20	30	40	50	4	10	20	30	40	50
5	10	20	30	40	50	5	10	20	30	40	50
6	10	20	30	40	50	6	10	20	30	40	50
7	10	20	30	40	50	7	10	20	30	40	50

JAS. FLETCHER & CO.

Order No .....

TIME CARD.

Date .....

KIND OF WORK.

INDICATE TIME BY AN X ACROSS FIGURE.

Make only one entry on a Card.

Workman's Name. | Number.

FIG. 4.—WORKMAN'S TIME CARD.

The Williamson Furnace at Birmingham, Ala., was placed in operation last week. It will have a daily output of 75 tons.

Some New Things for the Shop.

A Simple Shaft Fastening.

A simple form of shaft fastening has just been patented by Charles B. Post, of New London, O., which is illustrated in Figs. 1 and 2. The device is shown in cross section in Fig. 1 and Fig. 2 is an end elevation. A shaft A is secured to the hub B by means of a key or dog C which passes diagonally through the hub to the shaft and is held in position by a cap screw D. The improvement allows a large bearing as the end of the key may be turned to the same radius as that of the shaft so as not to mar the surface. The end of the key, however, may be of any other desired form and a slight loosening of the retaining screw or bolt permits of free adjustment. The arrangement of the screw and key, as compared with either of the other common methods of attachment admits of pulleys and

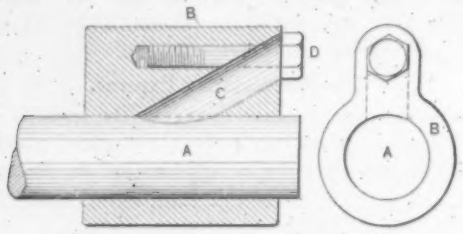


FIG. 1. FIG. 2.
A NEW SHAFT KEY.

gears being set closely together should this be desired, as only sufficient room for a thin wrench is required between the hubs. Both the barbarous setscrew and the driven key usually need space between the hubs to swing the hammer or the wrench. The former causes an objectionable burr and the rough place interferes with the removal of nicely fitting work. It will be seen that in operating the new fastening, the wrench swings in the line of rotation of the shaft and the device is thus easily reached and handled.

New Form of Machine Tool Construction.

William H. Baush, of the Baush Machine Tool Co., of Springfield, Mass., has patented a method of machine tool construction by which a number of tools may be used simultaneously on a large piece of work, each tool being independently movable in horizontal as well as vertical lines in opposite directions by means common to all of them. The tools are supported on one frame and equipped with independent means for driving them. By the aid of this construction, a number of radial drills, for example, may be employed on different parts of a large piece of work at the same time. The combination being of great advantage and materially cutting down the cost of performing such work as the tools being independently movable any one of them may be shifted at pleasure and not oblige the operator to wait for the completion of work being done by some other tool.

The drawing in Fig. 3 illustrates a portion of the arm of a radial drill supported on a frame, but other tools may be arranged in a similar way if desired. For instance, a shaper may be carried on the frame and moved horizontally and vertically in the same manner as the drill shown.

In carrying the invention into practice suitable posts A are erected along the wall of one side of the shop and to these posts are secured parallel bearing rails B and C which support the upper and lower ends of a tool carrying frame D. The upper end of this frame which slides on the rail B is made broad enough for a steady bearing, the lower end of the frame being connected with the rail C for guiding purposes only. There are blocks E at the upper and lower ends of the frame securely screwed to the latter and overlapping the rails B and C, to retain the frame in place on the rails. There may be as many of these frames as is necessary to accommodate the number of tools desired to operate on one piece of work at a time.

As has been stated, the frame shown in the drawing has the arm of a radial drill applied to it; but other forms of tools may be supported by making local changes in the manner of securing the tool carrying arm to the frame D so that the tool may be controlled in the same manner as the arm of the drill—that is to say, raised or lowered on the frame.

When a radial drill arm is supported on one of the frames D, it is desirable to provide some means, as a clamp F, for locking the arm of the drill in any position to which it may be swung. This clamp consists of two arms partially encircling the drill arm with a grip adjustable by screws; the arms being supported on a lug on the carriage where the drill arm is pivoted. The raising and lowering of the tool is effected by means of a screw shaft supported in the frame D and engaging with a nut on the tool carriage. The screw shaft may be rotated to the right or left by a geared connection H with a vertical shaft G. Each of the frames D is independently movable on the supporting rail by a driving connection which may be established with a continuously rotating shaft. Means are provided for moving the frame D on the supporting rail by the aid of a rack J, into which gear pinions connecting with a worm gear meshing in a worm which rotates loosely on the shaft G, but may be locked by means of a sliding clutch M. This clutch is operated by a shipper rod and the handle K. Above the worm is another clutch member N

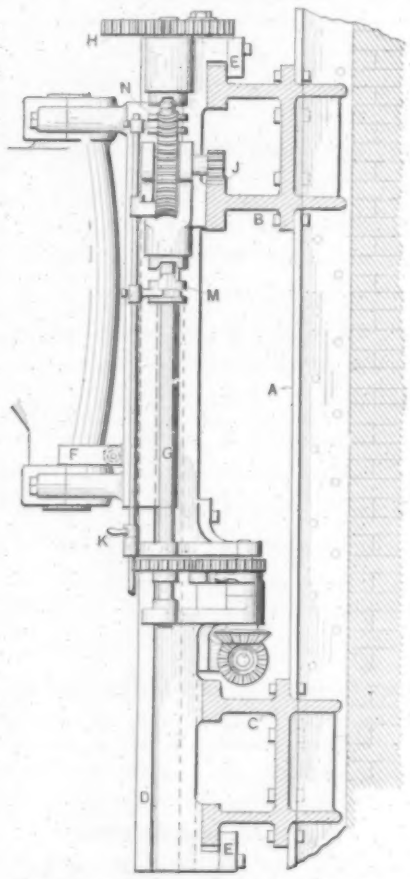


FIG. 3.—MACHINE TOOL CONSTRUCTION.

which in turn is employed to connect with the gears H and rotate the shaft to raise and lower the drill arm. There is an intermediate gear at the lower part of the arm so that the gears may be changed to run in either direction as needed.

Preferably whatever tool may be supported on the frame D is provided with an independent driving mechanism—as for example an electric motor—though this of course is a feature of entirely another story. At present there are thirty-six of these machines in use at the plant of the Pennsylvania Steel Co., at Steelton, Pa.

A Centering Device for Lathes.

John M. Fleming, of Ottawa, Can., has taken out a patent on a centering device for lathes. Fig. 1 is a perspective view of the device, and fig. 2 is a sectional elevation; the same reference letters being used to indicate corre-

sponding parts in each illustration. There is a cup-shaped socket A which turns freely on the body of the device and there is a supporting piece having a tapered shank to fit in and secure the attachment to the tail stock spindle of the lathe. A hole D is bored through the socket A, the body and into the shank C. A drill E is inserted and held by a blind screw.

Any suitable means may be employed for advancing or withdrawing the drill E, but the inventor prefers to have teeth formed on the drill. A pinion G is provided, having teeth to engage with the drill and a hand lever operates the pinion.

In order to prevent the conical cap A from slipping away from the body of the device, a groove is formed in the circumference of the cylinder, and a screw I is adjusted to just enter this groove. The supporting shank C is retained securely in the body of the attachment by the blind

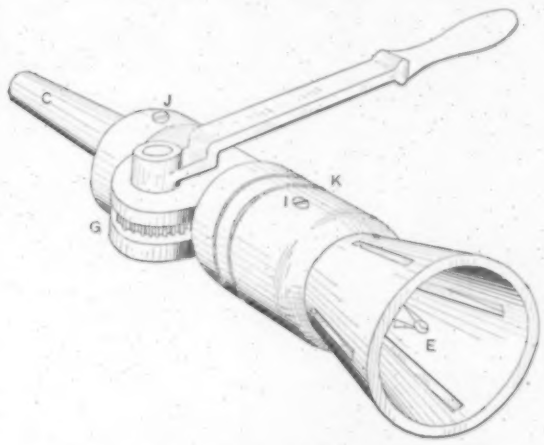


FIG. 4.—A CENTERING ATTACHMENT FOR LATHES.

screw J. It will thus be seen that the tapered portion C of the device may be jammed into the tailstock spindle, and this will hold the body part of the attachment rigid so that if a piece of shaft be fastened to the live center or chucked in the usual way and the opposite end inserted in the cup A then, owing to the friction between the end of the work and the cup, the loose portion will turn with the shaft. The drill E, which does not rotate, may now be advanced, and will drill and countersink a hole into the end of the work. A thrust bearing is provided between the rigid and the rotating portions of the device; in the engraving a ball bearing K is shown, having retaining rings

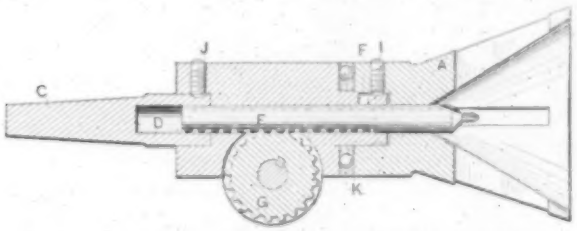


FIG. 5.—SECTIONAL VIEW OF CENTERING ATTACHMENT.

with a combined thickness slightly less than that of the balls. A number of slots are cut in the cup A in order to give the work a good grip, the edges of the slots causing a greater friction between the surfaces in contact.

A Novel Drill Chuck.

A novel variation of the time-honored drill chuck has been patented by Arthur I. Jacobs, of Hartford, Conn. This improvement is depicted in fig. 6 and the obvious difference in construction centers in the special means for opening and closing the jaws. The wrench A has a projection on the end which fits loosely in any one of a number of holes drilled around the circumference of the chuck body B. The knurled sleeve C has rack teeth formed on the edge, and these mesh with the pinion on the wrench A; the turning of the wrench giving a rotary motion to the sleeve and the internal nut to open or close the chuck jaws. Of course the same end may be attained by the use of body pins in the part B and the end of A can be recessed to fit onto the pins.

The chuck in this way may be opened and closed without the employment of a spanner for turning the sleeve and without the necessity of holding the body of the chuck or the drill spindle against movement. This effects a sav-

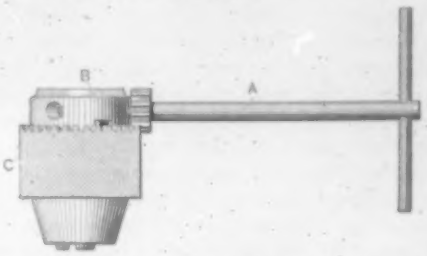


FIG. 6.—NOVEL FORM OF DRILL CHUCK.

ing of time and frees one hand, as the wrench holds the body of the chuck firmly and at the same time is available for tightening or loosening the drill.

A Tool Post for Lathes.

Fig. 7 illustrates a new tool post invented by John R. Back, superintendent of the shops of the F. E. Reed Co., of Worcester, Mass. This improvement is shown in side elevation, the part A being the rest or slide worked by a hand wheel or crank and a screw. There is a planed surface on A with a T-slot B to receive the head of a bolt C, and resting on the top of the tool rest A is a post having a hole through which the bolt C passes. There is an overhanging lug at the upper end of the post through which is tapped holes for a couple of binding screws D. The cutting tool rests upon a curved block having the upper surface concave, and curved in the arc of a circle and fitting the convex side of the supporting piece, which stands upon the tool rest A. These supporting blocks are movable, and are adjusted on the tool rest to suit the position of the tool and this can be tilted to raise or lower the cut-

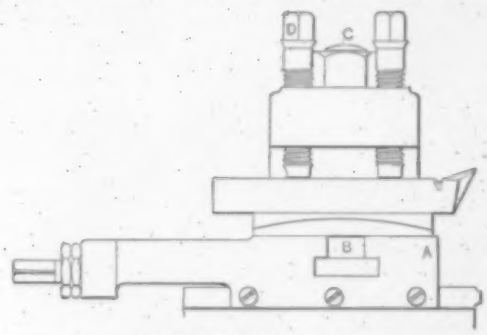


FIG. 7.—NEW TOOL POST.

ting edge. The tool post has a projecting flange on the side opposite to the overhanging lug, which bears upon the tool rest in order to better resist the strain caused by clamping the tool by the screws D. The head of the bolt C is also lengthened in the direction of the T-slot B so that the same strain, tending to tip the tool post, will be received by the walls of the slot.

An English Design for Lathes.

Another and more radical suggestion in lathe and other machine tool design is the subject of the English patent granted to James Brockie, of Forest Hill, London. The object of the inventor has been toward the improvement of the wearing surfaces, to prevent the sliding part being forced up the inclines of the guide and to obtain better means of adjustment. How far the object sought has been attained may be seen by an examination of fig. 8 which shows a lathe bed constructed according to this invention. The bed consists of the bearing rails 1 and 2, each having an upper surface 3 and 4 extending the length of the bed and both surfaces being inclined at the same angle and sloping in the one direction across the bed. The inclination of the surfaces 3 and 4 is such that the slide rest will tend to descend the inclines by gravity toward the front of the machine. The front member has a guiding surface 5 upon the inner side, this surface being at less than a right angle with the inclined carrying surface 3 of the rail. The slide rest 6 has the saddle formed with a long runner 7

on the under side to rest upon the angular surface 3 of the front rail, and also upon the vertical guiding surface 5 of the same member; while at the back, the saddle 6 is shaped to fit and rest upon the inclined part 4 of the rail 2. The saddle bears upon no other part of the rails, so that by gravity alone the saddle will adjust itself in line with the front rail, owing to the slope of the rails. By this construction any thrust upon the sliding member 6 acting in a direction transversely of the bed, from the back and towards the front rail 1, will not tend to lift the slide from its bearing surfaces, but on the contrary the similar inclinations given to the upper surface of the rails 1 and 2 will tend to force the slide 6 in the direction of the inclination, and cause the rib, which bears against the guide surface 5 to be more firmly engaged and prevent any upward

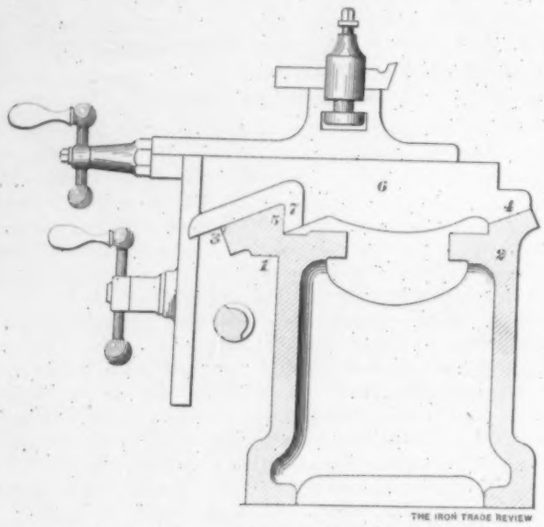


FIG. 8.—AN ENGLISH SUGGESTION IN LATHE DESIGN.

lift of the slide. The back part of the carriage is prevented from tilting by a gibbed plate which rests against the under side of the rail 2.

A Tap and Die Holder for Turrets.

A new form of tap and die holder for turret purposes has been invented by F. C. Tyler, of Cleveland. The device is shown in Figs. 9 and 10; the former being a sectional view, and the latter being partly in section and the tool has been turned through an angle of 90 degrees in order better to illustrate the locking action. The turret A receives the shank of the tool holder B which is secured by a binding screw, and the other end of B is a working fit in the socket C. A groove D is turned around the circumference of the enlarged portion of B and notches are cut out of each side of the slot so that the corners of a

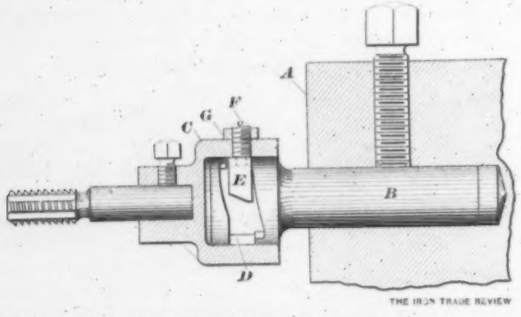


FIG. 9.—TURRET HOLDER FOR TAPS AND DIES.

dog or catch E may engage when desired in the position shown in fig. 10. This dog E is held in position relatively to the socket C by a blind screw which has a turned point fitting loosely in a hole drilled in the center of the dog E and the screw is locked by a jamb nut G. The dog is best made from a portion of a steel ring turned to the size of the groove D and ordinarily as seen in fig. 9 the dog will follow the groove and not strike the notches at the side. When the tap enters the hole the part C is forced slightly to the rear and on B. The pressure at once tilts the dog which immediately locks the device for tapping. The curve of the dog and groove matching each other so that when the socket C and shank B are disengaged, there is no likelihood of the accidental catching of the notches as the dog must lift from the slot in order to turn around the axis of the blind screw F.

The slot D can thus be but a trifle wider than the dog and as soon as the corner of the notch on either side

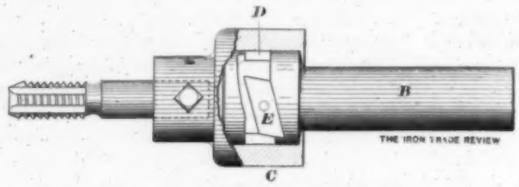


FIG. 10.—ANOTHER VIEW OF TURRET TOOL.

passes the center of the dog, the movement is multiplied at the locking point, whenever the pressure is brought to bear endwise on the device. The appliance is shown as arranged for right-handed taps and dies, but the cutting of the notches in the opposite direction for left-handed threads will be readily understood. The device requires a minimum of end motion in order to be brought into action, and seems equally effective as it is simple in construction.

A Substitute for the Center or Wedge Key.

A substitute for the center key or as the Patent Office designates it, a "tool-dismounting instrument," has been devised by Martin Steudner, of Gera-Zwotzen, Germany. Every mechanic is well acquainted with the numerous tribe of centers, drills and other tools held in conical sockets, and which have an end lug to prevent rotation in the holder. The lug being seated at a slot in which a wedge key can be driven and the tool forced out of the socket. Driving

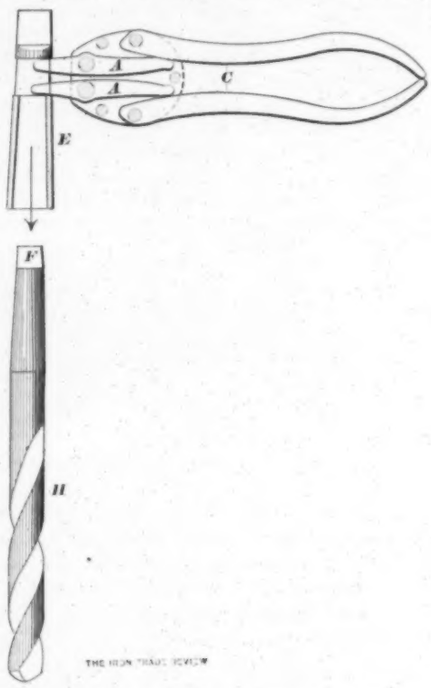


FIG. 11.—A SUBSTITUTE FOR THE CENTER KEY.

a wedge is obectionable for obvious reasons, and in some cases where such practices are to be avoided anyway a screw threaded portion of the spindle has a nut which bears against the mouth of the socket, and the piece can be backed out very nicely and in workmanlike style. Such an arrangement is common enough on milling machine arbors, etc. The expense and other reasons prevent this method becoming common for any but the purposes named and the present invention is an attempt to fill the long felt want. The wedge key is far from being a perfect device

for the purpose, but it would be difficult to improve upon the simplicity of the scheme. The crude method, however, does no good either to machines or tools and in the case of reduction bushings there is an increased chance of injuring the parts. Furthermore, the driving out of the tool by means of a wedge has the disadvantage of requiring as a rule the holding of the wedge in the one hand and a hammer, or maybe the too convenient monkey wrench, in the other so that the tool itself is not held during removal, and in falling can easily become injured or dull.

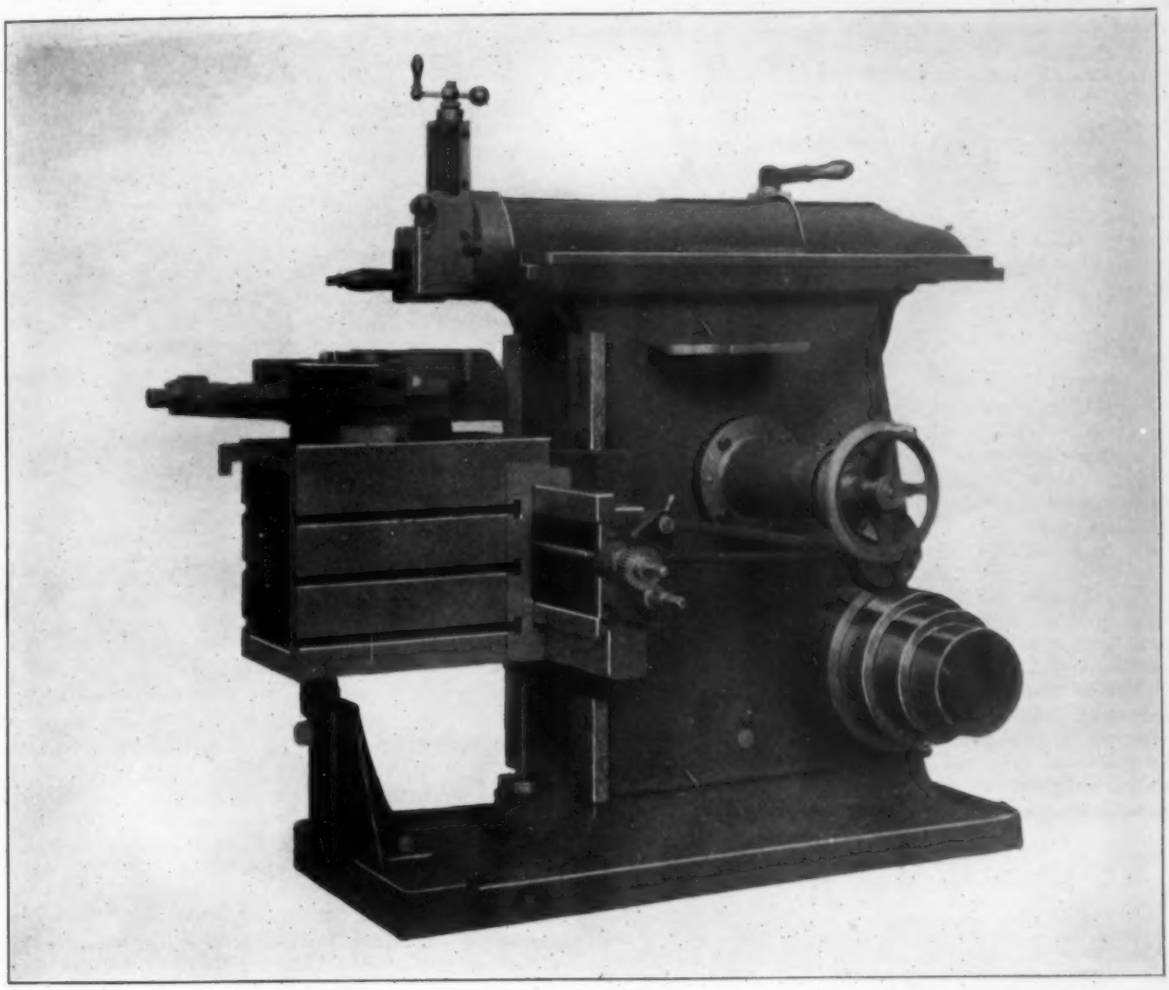
The invention shown in Fig. 11 consists of a pair of tong-legs AA, pivoted in a small casing and separated by a flat spring. The tong-legs are acted upon by another pair of levers C forming the handle of the tool. The drill H has a lug F on the end of the tapered shank, which fits the conical socket E. The engraving shows how the tool has been inserted into the slot and by compressing the tong-levers the drill has been forced out, the manipulation of the tool requiring but the one hand so that the drill can be held by the other.

The new plant of the West Virginia Bridge & Construction Co., at Glennova, near Wheeling, W. Va., will be placed in operation about December 1. The main building is 90x300 feet and contains a large amount of machinery such as punches, shears, pneumatic riveters, etc. The equipment is modern in every particular. A large stock yard has also been provided which will be commanded by a ten-ton crane with a span of 50 feet.

The New Hartford Machine Co., New Hartford, N. Y., has leased a building and will install a large amount of machinery immediately.

A NEW CRANK SHAPER.

The crank shaper shown on this page is the latest product of the American Tool Works Co., of Cincinnati. This shaper is a thoroughly modern tool throughout, and much heavier and stronger in every way than former models. The column is of unusual depth and width, tapering slightly from base to top, adding to the solidity as well as the graceful appearance of the machine. The base is of the extension type, and the ram has long, wide bearings in column, with improved oiling facilities. Table, cross-rail and so on have all been given additional dimensions and weight, thus giving the machine as a whole a greatly increased power and capacity, yet retaining a graceful, well proportioned and compact appearance. The stroke is positive and length may be changed at will without stopping the machine. The index shown on the ram, facilitates the setting of the stroke to the length desired. The rocker arm is pivoted near the base line and this gives the ram a nearly uniform rate of speed during the entire stroke, and provides an exceedingly quick return. The rocker arm is of double section pattern, permitting a large sized shaft to be passed under the ram, through the hole shown in the top of the column, for keyseating.



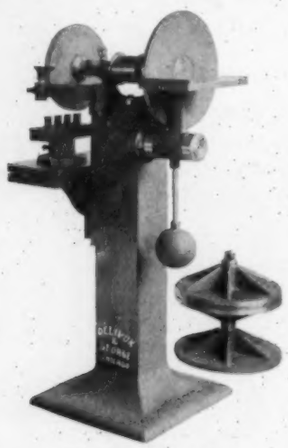
NEW CRANK SHAPER.

This shaper is easy and smooth in operation and is susceptible of fine and positive adjustments while under full speed. The line of sizes includes 16-inch single geared, and 16-inch, 18-inch, 21-inch and 25-inch back geared.

The American Foundry & Machine Works, Crowley, La., have been consolidated with the Champion Iron Works Co., Ltd., a new concern, which is now building a plant. The officers are: Henry Loewer, president; M. D. Abbott, vice president, and Ben Stagg, secretary and treasurer.

A NEW DIE GRINDER.

This tool is designed for the grinding and finishing of flat surfaces, such as blanking, piercing and stamp dies, punches, rivet machine tools and similar work. For the grinding of punches a holder is furnished to receive the shank; in this manner such work is as easy as grinding a flat die. The table is hinged to a bracket at one end, with a screw under the opposite end, by which a fine adjustment can be obtained. The bracket has a vertical adjustment of 14 inches, is counterbalanced by a weight inside of the pedestal, may be raised and lowered very quickly, and can be securely fastened to the column by the movement of a cam lever. An arm is provided to swing from one wheel to the other, to act as a tool rest or for the purpose of truing up the wheels. The steel spindle runs in anti-friction bearings arranged for taking up all wear, and carries a wheel at each end. A wheel 10 inches in diameter with an inch face is best adapted to this grinder. A disc attachment can also be



NEW DIE GRINDER.

furnished as shown in cut. It will grind a great deal faster than a solid wheel and the work produced is always true and flat. This grinder does not compete so much with emery wheels as files. A saving in time is claimed of 75 percent over filing while the work is more accurate. The emery cloth or paper is secured to both sides of the discs with a quick-drying cement, used cold. Two 12-inch discs and a disc cementing press are furnished with each machine. The manufacturers are Delivouk & George, of South Clinton St., Chicago.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Syracuse Foundry Co., Syracuse, N. Y., has been incorporated with a capital of $10,000, for the manufacture of metal specialties.

Wm. H. Berry, Chester, Pa., who leased a building recently, will establish a machine shop.

The H. P. Cameron Electrical Mfg. Co., Ansonia, Conn., will soon be in the market for a large amount of new machinery.

The Empire International Car Coupler Co., of New York, has been incorporated with a capital of $500,000. The directors are: Charles E. Soule and John B. Genin, of St. Albans, Vt.; Emanuel P. LaChapelle and J. R. Genin, of Montreal; John J. Tandy, Asa R. Kennedy, Henry West, R. M. Crater, J. B. Henney, John J. Donovan and Arthur G. Hill, of New York, and A. M. Powell, of Worcester.

The Decatur Bridge Co., Decatur, Ill., is in the market for boilers and engines for its new plant.

Chattanooga Machinery Co., Chattanooga, Tenn., wants second-hand 300-foot five-ton handpower traveling crane.

The Chesapeake Iron Works, with $15,000 capital, to erect a plant for the manufacture of nuts and bolts, has been incorporated at Baltimore. Charles L. Applegarth, C. G. Smith, John Burneburg, John G. Doan, and Frank Chavannes are the incorporators.

The Toledo Castings Co., of Toledo, O., has been incorporated with $50,000 capital for the purpose of operating an iron foundry. W. C. Wright, W. R. Sinclair, L. W. Storey, M. S. Dodd and C. A. Schmettau are the incorporators.

The Freeport Spring Co., Freeport, Ill., has been incorporated with $25,000 capital for the purpose of engaging in the manufacture of steel springs. S. Hoefer, A. G. Hoefer, E. A. Hoefer and F. N. Hoefer are the incorporators.

The Williams Foundry & Machine Co., of Cincinnati, has been incorporated with $50,000 capital under the laws of the State of West Virginia.

S. P. Pearson & Co., of New York, has been incorporated with $50,000 capital for the purpose of engaging in the ornamental iron business. S. P. Pearson, M. Lensky and H. Rosen are the incorporators.

The Edgerton Motor Manufacturing Co., of Philadelphia, has been incorporated with $30,000 capital.

The Haugh-Noelke Iron Works and the Indiana Ornamental Iron Works, both of Indianapolis, Ind., have decided to consolidate under the name of the Noelke-Richards Iron Works. The one concern operates a structural fitting shop while the other operates an ornamental iron works.

The Syracuse Foundry Co., of Syracuse, N. Y., has been incorporated with $10,000 capital for the purpose of operating a small iron foundry. Robert Love, L. H. Kruger and G. J. Hessler are the incorporators.

The Garden City Iron Works, Chicago, have been incorporated with $2,500 capital to engage in the manufacture of structural and ornamental iron work. C. A. Bitza, J. V. Prochaska and John A. Houha are the incorporators.

The Duncan Coal & Iron Co., of Louisville, Ky., has been incorporated with $10,000 capital. J. C. Mayo, J. F. Howes and Marvin Mayo are the incorporators.

The Sistersville Tank Manufacturing Co., of Sistersville, W. Va., has been incorporated with $10,000 capital for the purpose of engaging in the manufacture of all kinds of steel and wood tanks. D. D. Nolan, T. J. Moran, D. E. Thoenen, E. U. Cooney and T. F. Birmingham are the incorporators.

The W. J. Darling Machine Co., of Buffalo, N. Y., has been incorporated with $10,000 capital for the purpose of engaging in the manufacture of shoe manufacturing machinery. William J. Darling, L. Geyer, U. V. Schaurot and A. F. Geyer are the incorporators.

Letson & Burpee, foundrymen of Fairhaven, Wash., have purchased a site at Seattle, Wash., and will erect a foundry plant.

A. C. Thompson & Co., Ltd., North Sydney, N. S., have purchased the plant of the Lunenburg Foundry Co., Lunenburg, N. S., and will move it to North Sydney.

At a special meeting of the stockholders of the Morse Iron Works and Dry Dock Co., of Brooklyn, N. Y., held last week, it was decided to increase the capital stock, owing to the growing business, from $550,000 to $1,000,000.

The Imperial Pneumatic Tool Co., of Sherbrooke, Quebec, has been incorporated with $25,000 capital for the purpose of engaging in the manufacture of pneumatic tools. F. W. Parsons, H. D. Lawrence, E. W. Gilman, W. R. Elliott, F. E. Gilman, J. R. Rand and F. A. Brainerd are the incorporators.

The Jacksonville Machine & Boiler Co., of Jacksonville, Ill., has been incorporated with $6,000 capital for the purpose of engaging in the manufacture of boilers. E. J. Rawling, A. W. Kellogg and J. F. Kellogg are the incorporators.

The Heating, Ventilating & Foundry Co., of Wheeling, W. Va., is in the market for one 25-h. p. and one 50-h. p. gas engine.

The Farrel Foundry & Machine Co., of Ansonia, Conn., has increased its capital stock to $1,150,000, and has in-

creased the par value of its shares from $25 to $100 each.

Fires and Accidents:—

The large machine shop of the Humphrey Mfg. Co., Mansfield, O., was partially destroyed by fire Nov. 2. Loss, $10,000; fully covered by insurance. Rebuilding will begin immediately.

The foundry and machine shops of George McArthur at Findlay, O., were destroyed by fire Nov. 2. Loss, $10,000; partially insured.

The shops of the State University of Arkansas at Fayetteville, Ark., were recently destroyed by fire. Loss, $50,000, with no insurance.

At Beaumont, Tex., Oct. 30, the roundhouse and shops of the Santa Fe and three or four locomotives were burned. Estimated loss, $75,000.

The National Horse Nail Co.'s Works, in Vergennes, Vt., were destroyed by fire, Oct. 29, with a loss of $75,000.

The tool and a portion of the machine shops of the South Side plant of the Jones & Laughlin Steel Co., Pittsburgh, Pa., were destroyed by fire last week entailing a loss of $75,000.

The Coulter & Campbell brass foundry, Toronto, Ont., was damaged by fire last week to the extent of $5,000.

New Construction:

Pettibone, Mulliken & Co., Chicago, manufacturers of frogs, crossings, and switch material for steam railroads only, have increased their capital stock for the purpose of captalizing surplus, and providing funds for the construction of a new plant. They have purchased for cash 30 acres, at West Division St. and the Chicago & Western Indiana tracks, and purpose erecting thereon, a modern plant for their business. Work will be commenced immediately, and will be pushed to completion as rapidly as possible. It is expected to have the new plant in operation by May 1, 1903. The old works, situated in the block bounded by Hawthorne Ave., Eastman, Dayton and Rees Streets, will be continued until the new plant is actually running. The new works, when completed, will be the largest of the kind in the world.

The Reed Improvement Co., recently organized at Battle Creek, Mich., with a capital of $150,000, is making preparations to erect a brick factory building, but definite plans have not been made. The plant will probably be 50x100 feet and will be equipped with the latest improved machinery. The principal output at first will be the Reed single share and reversible plows. It is expected that the company will have plows ready for shipment by Jan. 1 and be prepared to fill all spring orders.

The Wright Taper Roller Bearing Co., Buffalo, is erecting a new building at a cost of $30,000. It is three stories, slow burning construction.

F. G. Street, 36 LaSalle St., Chicago, has been appointed agent for Northern Illinois, Indiana, Michigan, Minnesota, Wisconsin, North and South Dakota, and Kansas, for the Scaife and We-Fu-Go water softening and purifying systems—manufactured by Wm. B. Scaife & Sons Co., Pittsburg. Mr. Street is known throughout the above territory in manufacturing and engineering circles, and has given the subject of water purification considerable attention.

The Aurora Automatic Machinery Co., Aurora, Ill., is adding a two-story addition to its plant.

The American Mfg. Co., Racine, Wis., will erect a $20,000 factory building, 310x100, having steam heat and power, Carey's roofing, two freight elevators, etc. A. L. Flegel & Co., Racine, Wis., architects.

The Gueydan Machine and Pipe Works, Gueydan, La., have purchased site for erection of addition to the plant.

Work has been begun on the construction of the new roundhouse of the New York, New Haven & Hartford R. R. at Bridgeport, Conn. The cost will be $50,000.

The brakebeam plant to be erected by the Chicago Car Equipment Co., at Delray, near Detroit, will cost $500,000 and turn out 300,000 breakbeams a year.

The Pequonnock Foundry, recently incorporated, has leased a building at Bridgeport, Conn., and remodeled it for foundry purposes. The foundry is doing special work in gray iron castings and has a good business.

The Berry Mfg. Co., Muscatine, Ia., has let the contract for the erection of a new foundry, 40x80, stone and brick. All the castings used by the company will be made in this foundry.

The Belmont Iron Works, Philadelphia, will build an addition to their foundry. It will be of steel, one story, corrugated iron sides, 20x79 feet, and will cost $2,000.

The Benedict & Burnham Mfg. Co., Hartford, Conn., has plans prepared for the erection of a foundry which will be 100 feet long and 200 feet wide.

The Toronto Brass Mfg. Co., Toronto, Ont., will erect a five-story plant, whose dimensions will be 98x100 feet. The plant will contain a brass foundry as well as a large brass fitting and finishing department.

The plant of the Vance Boiler Co., Geneva, N. Y., will be greatly enlarged by the erection of an addition 80x100 feet.

The American Can Co. is erecting a large can stamping plant at Portland, Ore., which will consist of two buildings each 40x320 feet.

The Torrey Roller Bushing Co., Bath, Me., will increase the capacity of its plant by the erection of an addition 62x111 feet.

Work on the erection of the new plant of the Ball Engine Co., Erie, Pa., is progressing favorably. The erection of the structural steel has already been commenced, and it is believed that the buildings will be under roof by the first of the year.

The Cambria Foundry & Machine Co., Johnstown, Pa., has decided to go forward with the erection of a new foundry. A number of sites are now under consideration.

The Manufacturers' Foundry Co., Waterbury, Conn., has prepared plans for the erection of a foundry and machine shop which will be 400 feet long and 80 feet wide.

The work of rebuilding that portion of the plant of the Lorain Foundry Co., Lorain, O., which was destroyed by fire some time ago, is progressing favorably. An addition 96x150 feet is also being made. This will be completed about the first of the year and will greatly increase the capacity.

The Stuart-Arbuthnot Machinery Co., Winnepeg, Manitoba, is hastening the completion of the addition to its plant, which is two stories, 40x132 feet. It is the intention of the company to add a foundry next spring.

The Spalding Mfg. Co., of Chicopee Falls, Mass., has added to the size of its plant by leasing one of the mills of the J. Stevens Arms & Tool Co.

An addition to the plant of the Verona Tool Co., at Oakmont, Pa., has been started and it is the intention to double the present capacity of the works.

The Packard Motor Car Co., Warren, O., is erecting two one-story buildings for machine shop and erecting purposes.

The New England Enameling Co. has been incorporated with a capital of $50,000. The president is I. Bauer, and the selling department at 61 Beekman St., New York, is in charge of H. Ginsburg, who, with other heads of the departments, had previously been with the National Enameling & Stamping Co. The plant is located at Middletown, Conn., and plans to double its capacity have been perfected.

The Pittsburg District:—

Homer Bowes, formerly of J. B. Jones & Co., dealer in scrap iron, rails and machinery, 515 Bijou Building, Pittsburg, is preparing to locate permanent storage yards for dealing in new and relaying rails, machinery, scrap iron and metals. He is a buyer of railway equipment, abandoned works or second-hand machinery.

The Keystone Car Wheel Co., of Pittsburg, with works at West Homestead and Hay's Station, has made a specialty of street car wheel work since it started in business two years ago. Its wheels are now used by 50 or more of the leading roads of the country. The experience of three car wheel foundries of long standing was drawn upon both for the arrangement and equipment of the plant and

for the practice followed in manufacture. No special attention is paid to export business, but several foreign orders have come to the company. The present output is at the rate of 300 to 400 wheels a day, and is being steadily increased.

The Vesta Coal Co., one of the subsidiary companies of the Jones & Laughlin Steel Co., has acquired a tract of 180 acres of coal land near Coal Centre, Pa., at $500 per acre. The property will soon be developed.

In order to secure the location of the $10,000,000 tube plant of the National Tube Co., which will be located at McKeesport, Pa., the citizens of that city will be compelled to raise $45,000 additional by public subscription, although $20,000 has already been raised in that way. Some of the owners of property have advanced their prices during the past few weeks, and as the property was to be turned over to the National Tube Co. for $750,000, the additional amount must be raised in order to secure the erection of the large additional plant.

The Beaver Valley Metal Co., which has been chartered with $10,000 capital, has taken over the plant of Louis A. Glaser, at New Brighton, Pa. Many improvements and extensions are to be made. The plant is thoroughly equipped to manufacture brass, bronze, aluminum and copper castings, as well as babbit and anti-friction metals. The present capacity of 5,000 pounds daily is to be increased. The local office of the company is in the Frick Building. W. D. Berry is president; L. A. Glaser, secretary and treasurer, and G. T. Hildebrand, general counsel.

At the annual meeting of the stockholders of the Firth-Sterling Steel Co., at Demmler, Pa., last week, directors were elected as follows: L. J. Firth, A. A. Wheelock, J. W. Kinnear, J. H. Willock, and E. B. Clarke. A meeting of the directors will be held shortly to elect officers.

The Fort Pitt Engineering Co., with offices in the Publication Building, has been incorporated with $50,000 capital. The company has been in business for some time being engaged in iron and steel engineering work.

It is estimated that the Bessemer & Lake Erie Railroad will carry 4,000,000 tons of ore from Lake Erie ports to Pittsburg this year. In 1901 the total was 3,662,000 tons. Plans are being made to carry no less than 5,000,000 tons next year.

The Pittsburg Filter Mfg. Co., Empire Building, Pittsburg, Pa., has had an unusually busy year installing water works filters and water softening plants. Besides having constructed the largest water softening plant in the world of 2,500,000 gallons capacity for the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., it has installed the following: Colorado Fuel & Iron Co., Pueblo, Colo., 7,500 h. p.; Indianapolis Water Co., Indianapolis, Ind., 3,000 h. p.; Cleveland Furnace Co., Cleveland, 6,000 h. p.; Morey-LaRue Laundry Co., Elizabeth, N. J., 1,500 h. p.; Laflin & Rand Powder Co., Pompton Lakes, N. J., 1,000 h. p.; Hildago Mining Co., Parral, Mex., 500 h. p.; Delaware, Lackawanna, & Western Ry. Co., Groveland and East Bethany, N. Y., (each) 300,000 gallons daily; Keokuk Cereal Co., Keokuk, Iowa, 600,000 gallons daily; Sharon Water Works Co., Sharon, Pa., 2,000,000 gallons daily; Waynesburg Water Co., Waynesburg, Pa., 1,000,000 gallons daily; Columbia Water Co., Columbia, Pa., 2,000,000 gallons daily; Upper Sandusky Water Co., Upper Sandusky, O., 1,000,000 gallons daily; United States Zinc Co., New York, 600,000 gallons daily.

The rod department of the Rankin, Pa., plant of the American Steel & Wire Co., has resumed operations after an idleness of nearly two months, due to the breaking of an engine shaft.

General Industrial Notes:—

Stephen Noble and George Noble, of Anniston, Ala., have purchased at $5,000 a 13-acre tract of land near Cedartown, Ga., and will develop iron ore deposits.

Orput & Rogers, Platteville, Wis., have leased a building in which they will establish a machine shop for the manufacture of mining machinery and supplies.

Both the sheet and tube mills of the Sharon Steel Co., Sharon, Pa., will be placed in operation about the first of the year. The sheet mill building is completed, as well as the furnaces and the foundations for the mills and engines. The greater portion of the machinery is already on the ground. The tube mill building is not entirely complete, although work is being rushed by the American Bridge Co. The furnaces in the latter plant are all in, and much of the machinery is on the ground awaiting installation. The foundation for one of the two additional blast furnaces which will be erected during the next twelve months, is almost completed and the building of the stack, as well as the stoves will be commenced very soon. A large amount of filling in remains to be done before the foundations for the next furnace can be laid. As the blowing capacity of the present furnace plant is not great enough to secure the maximum output, a third engine of the Mackintosh-Hemphill type is being erected, and will be placed in operation shortly. The Sharon Tin Plate Co. has only ten mills in operation at present, and it will probably be some time before the entire plant is again on in full. The tin house was started this week.

At the annual meeting of the Sawyer Tool Mfg. Co., Fitchburg, Mass., Lyman H. Goodnow was elected president; J. F. D. Garfield, vice-president; E. D. Garfield, treasurer. The above named officials together with E. E. Ellis, comprise the board of directors. Mr. Ellis succeeds Mr. Sawyer, who has sold out his interest in the company.

The buildings of the tin plate plant of the American Tin Plate Co., located at Joliet, Ill., are now offered for sale, the plant being otherwise entirely dismantled. The mills have been distributed among the various other plants of the company, while some of the oldest machinery was scrapped.

The Lackawanna Steel Co., Buffalo, has purchased the plant of the Lake Erie Engineering Works at the same place, and will operate it for the manufacture of its tools and a large portion of its machinery. Richard Hammond, president of the Lake Erie Engineering Works, will continue in charge of the plant. No work will be done hereafter by this plant for the general trade.

William Jones, largely interested in the Toledo Foundry & Machine Co., Toledo, O., has leased the Robinson power house at that place and will insta.' a large amount of machinery for doing marine machine manufacturing work. The plant will be operated under the name of the Globe Iron Works.

The North mill of the Republic Iron & Steel Co., at Terre Haute, Ind., was closed for an indefinite period on November 1. The South mill at the same place has been placed on three turns instead of two, giving employment to nearly all of the men at the North mill.

Ctapping of Monitors Delayed.

(Special Correspondence.)

WASHINGTON, Nov. 4.—Dealers in old material will find cause for disappointment in a decision made by Secretary Moody of the Navy Department. Owing to the objections in the past to the sale of the sloop of war Vermont and other condemned vessels which figured in the Civil War, the secretary has reconsidered the plan for selling the monitors Nahant, Lehigh, Montauk, Canonicus, and Jason at the League Island Navy Yard, Philadelphia, and no definite action will be taken in the matter until after Congress shall have had an opportunity to make special provision to that end. The old iron gunboat Monocacy has also outlived her usefulness and the Navy Department has ordered that she be surveyed preparatory to offering her for sale.

WASHINGTON, Nov. 4.—Bids will be opened at the Bureau of Supplies and Accounts of the Navy Department on Nov. 18 for furnishng various supplies for the Puget Sound Navy Yard. Among the items are 460 pairs of standard angle-bar joint splices, 12 sets of frogs and switches, 105 tons of standard steel rails, 3 steel or wrought iron turntables and two track-laying cars. Bids are also invited for supplying for the same station an electric generating and distributing plant of 100 kilowatts output capacity, the apparatus including one self-contained, horizontal, tandem-compound, condensing, automatically governed engine, direct connected to two 125-volt generators.